TANGANYIKA

# Annual Report
of the
# Department of Agriculture
# 1954

## PART I

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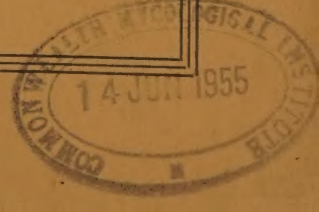

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## PART I

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TANGANYIKA

# ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, 1954

## INTRODUCTION

### Policy

In a territory as large as Tanganyika it is impossible to generalise without making exceptions, but it is comparatively safe to state that some spot can be found where conditions are suitable for the growing of any agricultural crop, tropical or temperate. Under such diverse conditions of soil, rainfall and temperatures and with the further complication of very extended lines of communication, an overall agricultural policy has to be so flexible that there is a danger of its being stated in meaningless platitudes, and progress can only be recorded on a piecemeal basis.

It is now accepted as a fundamental principle that no sound agronomic progress can be made until soils have been more or less stabilised. Soil conservation and correct land usage therefore take the forefront in planning agricultural policy. Very varied methods have to be adopted to suit the topography, the rainfall, the type of farming and the crops grown in different parts of the Territory. A pattern of these requirements is steadily taking shape, and there are now comparatively few areas for which workable plans have not yet been devised. Acquiescence with the ultimate aims on the part of all races of farmers is making slow but appreciable progress.

Territorial self-sufficiency in staple foodstuffs was achieved in respect of maize, sorghum, millet and rice, and it is expected that surpluses will be available for export when the 1955 harvest reaches the markets. There was a welcome swing over to sorghum in some of the marginal maize areas, but the disposal of the crop bought at guaranteed prices presented difficulties, and towards the end of the year it was announced that in 1955 the Government would only offer a much lower support price of Shs. 30/- per bag for white types. The guaranteed price for maize proved so attractive to Africans in Iringa district (Shs. 35/08 per 200 lb. bag) that in some places extensive damage was done to protective forest not covered by reservation. The value of cassava as a stand-by in times of shortage was again proved to the hilt in some areas. The wheat position, however, is becoming less and less satisfactory as the African demand for white bread increases. The areas in the Territory which are suitable for wheat growing are decidedly limited and as time goes on it will either be necessary to popularize a loaf made from mixed flours or else to rely on supplies of imported grain. In the past the deficit has usually been obtained from Kenya, but that Colony is also faced with expanding demand.

The year saw a further increase in the numbers of Africans who are farming on a scale greatly in excess of small-holding level, and it has now become impossible to distinguish between peasant and large farms on a racial basis. It was therefore decided that the Crops (Increased Production) Ordinance, which was designed

specifically for non-native farmers holding rights of occupancy, should not be continued after the 1955 harvest. One of the main tasks for the coming year is to design a new pattern in which some form of multi-racial Committees will play their part.

Out of the ashes of the Overseas Food Corporation a young phœnix entitled the Tanganyika Agricultural Corporation began to arise. The new body will be much more closely integrated with the agriculture of the Territory and, although its precise functions have yet to be defined, there is no doubt that it will play a major part in future development.

The policy of divorcing crop marketing from commodity boards set up under the African Agricultural Products (Control and Marketing) Ordinance was carried a stage further when the Bukoba Native Co-operative Union took over the responsibility of selling the coffee crop. In Songea the fire-cured tobacco crop showed a welcome increase in volume as a result of the heavier responsibility placed on the Ngoni-Matengo Co-operative Union in 1953.

On the extension side important progress was made in the Uluguru Land Usage Scheme by the development of the "bush school" technique mentioned in my last report. As a result of these schools the local population is at last coming to appreciate the objects and reasons of measures which they are required to perform. Once local opinion has been won over in this way, very remarkable progress can be achieved in the field. Although the method is probably not suitable for all the tribes in the Territory, it can certainly be extended to many areas where it should effectively replace the old-fashioned *baraza*.

From the research point of view by far the most significant event was the progress made by the Rufiji Basin Survey sponsored by the Food and Agriculture Organization. These investigations have now reached the stage at which four "pre-pilot" schemes of 100–300 acres are being planned in selected parts of the basin. The object of these schemes is to obtain experience of pump irrigation, to determine water duty rates, to investigate double cropping systems and general agronomic problems, and later perhaps to test out methods of land tenure which would be suitable for the local populations.

Plant breeding work made excellent progress. From Ukiriguru an improved short-term sorghum (the first to emanate from the breeding scheme) is going into large bulking plots in 1955. At Ilonga a cotton selection from 47/10 having a higher ginning out-turn has reached the multiplication stage. The testing of hybrid mosaic-resistant cassava emanating from Amani reached a stage at which it will shortly be possible to bulk up the most promising strains for distribution. At Nachingwea promising results were obtained with maize strains into which significant resistance to Polysora rust has been bred.

In the Lake Province a second series of fertilizer trials on African grown cotton again proved that economic results can be obtained by the application of phosphates, and local co-operative societies are now keen to follow-up these indications on a commercial scale. At Tengeru in the Northern Province further work was done in an attempt to explain the adverse effect on grain crops of mulches and newly-broken land; interesting results were obtained, but the problem is still not solved.

At Ilonga significant increases in the cotton crop were again obtained by regular dusting against American bollworm, but these increases are only economic if the crop is well grown. Research in Zanzibar on the insects causing premature nut fall in coconuts still failed to reach a stage at which it was possible to apply any results on a commercial scale in this Territory. The treatment of white stem borer in coffee by dieldrin was extended to large-scale trials on selected estates.

It is unfortunately impossible to separate the cost of research from other activities of the Department; expenditure is undoubtedly high, but it is equally certain that this outlay will continue to pay worthwhile dividends.

## WEATHER CONDITIONS

Rainfall recorded throughout Tanganyika during 1954 showed in most cases a marked reduction from the average figures of previous years. In most cases the rainy season started off remarkably well and good planting rains were obtained in November and December, 1953. Unfortunately the usual break in the rains was prolonged into a dry spell lasting several weeks with the result that in some places early plantings of food crops died off. Replanting had to be done but many of these later-planted food crops did not fare well with the erratic and much-reduced main rains. Cotton on the other hand being deep rooted and more drought resistant stood up well to these periods of drought and the highest output ever recorded in the Territory was obtained—most of this coming from the Lake Province. In the Central Province the good rains obtained at the beginning of the planting season raised hopes that a good crop year would result but most of this early rain fell in the form of heavy storms which did extensive damage when falling on the over-grazed and unprotected soils of Ugogo.

Rainfall recorded in inches at representative stations was:—

| | 1954 *Ins.* | *Previous average Ins.* |
|---|---|---|
| Morogoro, Eastern Province ... ... ... ... | 33·65 | 35·03 |
| Dodoma, Central Province ... ... ... ... ... | 12·19 | 20·22 |
| Tabora, Western Province ... ... ... ... ... | 28·61 | 34·77 |
| Mwanza, Lake Province ... ... ... ... ... | 38·00 | 39·43 |
| Mbeya, Southern Highlands Province ... ... ... | 22·20 | 34·08 |
| Arusha, Northern Province ... ... ... ... ... | 31·88 | 43·96 |
| Lushoto, Tanga Province ... ... ... ... ... | 39·09 | 42·32 |
| Lindi, Southern Province ... ... ... ... ... | 27·23 | 35·84 |

The planting rains which fell in November and December, 1954, were good in the western and central areas of the Territory, but in the Southern Province little planting was possible east of Tunduru, and in Tanga Province conditions were far from satisfactory.

## FOOD CROPS AND FOOD SUPPLIES

The year 1954 was characterized by what is now regarded as the most severe food shortage ever experienced in the Central Province. At the beginning of the year many thousands of families in Dodoma and Mpwapwa Districts were receiving issues of food on loan from Government to tide them over until the 1954 harvest was ready. In the majority of instances these people only harvested sufficient food for two or three months and famine relief works had to be instituted from July onwards. The position was also aggravated by the fact that many

families, which last year were able to purchase food from the sale of livestock, this year having no saleable stock have had to fall back on Government assistance. Agricultural Department staff have had to spend a considerable portion of their time assisting with issues of food and supervising famine relief works. These relief works included the digging of hafirs and dams, construction of roads, soil conservation work in vital catchment areas affecting dams, railway embankments and roads, etc. Although this food shortage was caused by a combination of untoward events (torrential early rains, drought during the growing season and crop damage by army worm) it is now considered that crop failures in the Central Province would be far less frequent if the long-term sorghums grown at present were replaced by short-term varieties. Also, if all crops could be grown on land which is tie-ridged and manured.

Elsewhere, food crops were adequate to meet all local requirements; in fact record sales of cereals (particularly maize) were obtained in some Provinces, and there will be no need to import staple grains other than wheat before the 1955 harvest.

## MARKETING AND GRADING OF PRODUCE

### Foodstuffs

The purchase of wheat, maize, white sorghum and paddy remained under Government control during 1954. Basic guaranteed minimum prices paid to producers were:—

| *Per* 200 *lb., unbagged* | 1952 | 1953 | 1954 |
|---|---|---|---|
| Wheat, Grade I ... ... ... ... | 45/35 ... | 52/06 ... | 52/50 |
| Maize, F.A.Q. ... ... ... ... | 30/30 ... | 34/00 ... | 38/00 |
| White sorghum, F.A.Q. ... ... ... | 30/30 ... | 34/00 ... | 38/00 |
| Paddy, Grade I, per 100 kilos ... ... | 42/50 ... | 60/00 ... | 60/00 |

During 1954 the price differential for paddy based on quality operated only in three Provinces (Lake, Western and Southern Highlands) but this arrangement becomes Territory-wide in operation for all paddy harvested in 1955. Grade I paddy is defined as being of Faya and Kahogo varieties, Grade II being mixed varieties, including Borakupata in the Eastern Province.

Total purchases of grain by the Grain Storage Department in 1954 were.—

| | *Tons* |
|---|---|
| Maize ... ... ... ... ... | 51,879 |
| White Sorghum ... ... ... ... | 13,359 |
| Off-white sorghum ... ... ... | 5,961 |
| Rice (hulled) ... ... ... ... | 15,575 |

The sale of dried cassava which had been brought under Government control in 1953 was again removed from Government control in 1954. Further, supplies of staple food crops were so good after the 1954 main harvest that tenders were invited for the purchase for export of white sorghum purchased by the Grain Storage Department and which was surplus to the Territory's requirements.

Prices for the 1955 crops of maize and paddy have already been announced by Government and are the same as for 1954. White sorghum which was purchased at the same price as maize in 1954 will no longer be given a guaranteed minimum price although a basic support price of Shs. 30/- per 200 lb. naked will be paid to producers who sell their crops to the Grain Storage Department. Off-white sorghum has been de-controlled.

## The Marketing of Cotton

Cotton marketing continued under the ægis of the Lint and Seed Marketing Board which fixed basic prices paid to growers at 62 cents per pound in Lake Province for AR grade and 15 cents per pound for BR seed-cotton. The prices paid elsewhere in the Territory were 134 cents per kilogram for Grade A and 33 cents per kilogram for Grade C seed cotton.

In the Lake Province increased quantities of seed-cotton were marketed through co-operative societies; 64 registered co-operative societies operated in 1954. Fifty-two cotton stores have been built for the co-operatives from loans provided by the Lint and Seed Marketing Board. In all some 14,732 tons of AR seed-cotton and 841 tons of BR seed-cotton were marketed through Co-operative societies in the Lake Province in 1954; this represented 32 per cent of the total.

There were no changes in the auction system for selling lint and cotton seed. The Uganda Lint Marketing Board handled Lake Province lint, Lake Province seed was sold locally in Mwanza, and the Tanganyika Cotton Company handled all produce from the rest of the Territory. A small but appreciable profit was again made, and there was no necessity to call on the price assistance fund.

## Marketing of Tobacco

(a) *Flue-cured.*—The flue-cured crop in the Southern Highlands Province the bulk of which is grown by non-Africans, is graded, dried, conditioned and baled in the factory of the Southern Highlands Non-Native Tobacco Growers' Union. The crop is mainly of the unpopular Amarello type, and at the end of the year the Union's marketing agents were experiencing considerable difficulty in disposing of the surplus not required by East African manufacturers. The latter purchased the small Urambo and Tunduru Virginia crops direct from the growers.

(b) *Fire-cured.*—The African-grown crop in Songea was collected by twenty primary co-operative societies and delivered to the Ngoni-Matengo Co-operative Union for processing and sale. The higher grades were marketed overseas, the lower grades being sold in East Africa.

Fire-cured tobacco grown in the Lake and Western Provinces was again handled by the Nyamirembe Native Tobacco Board, but since there are no facilities for drying and conditioning tobacco at the Nyarambugu (Biharamulo) factory of the Board the entire crop is sold on the East African market at long-term contract rates.

## Marketing of Pyrethrum

The pyrethrum crop continued to be sold through the Kenya Farmers' Association.

## Marketing of Coffee

No further contracts were entered into with the Ministry of Food and all mild coffee was sold either on East African auctions or by forward contract with overseas buyers. The Kilimanjaro Native Co-operative Union sold their entire crop on the auctions held in Moshi while the Tanganyika Co-operative Trading Agency handled the arabica crop derived from co-operative societies of African growers in other parts of the Territory. The non-African crop of the Tanganyika

Coffee Growers' Association was sold partly by forward contract and partly through the Nairobi auctions, as also was the small arabica crop produced by the Wa-Meru in Arusha District. The Moshi auctions, though still unsupported by non-native producers, have become firmly established as an important centre in the coffee marketing system.

The Bukoba robusta and arabica crop continued to be sold by auction in Mombasa. In the expectation that a higher basic price would be declared by the Board, growers hoarded coffee in the early part of the year. On the announcement of the increased price the crop came forward in large quantities, but this coincided with a sudden fall in world prices, and realizing that heavy losses were being made, the Board ordered a standstill while new producer prices were being considered. These two factors caused deterioration in quality through poor storage conditions in producers' houses, and it was necessary to make special provision for the export of coffee which could not be made to comply with F. A.Q. standards but which was considerably superior to "Undergrade".

A radical change in the marketing of the crop was made on 1st November, 1954, whereby the marketing of the crop was handed over by the Bukoba Native Coffee Board to the Bukoba Native Co-operative Union.

### Produce Inspection Service

A Produce Inspection Service was started on a voluntary basis in January, 1954, at Mtwara port only, principally to deal with exports of cashew nuts. Later this inspection service was extended to include cassava. There are no facilities for fumigation but it is hoped that this will be introduced in the near future.

## MAIN CROPS

### Sisal

The sisal industry experienced a very difficult year. World factors of supply and demand, including less than average wheat harvests in America, caused a further decline in price. At the beginning of the year the price of No. 1 grade stood at £95 per ton c.i.f. and there was a hopeful rise to £103 at the end of January. From then onwards there was a steady fall until August when a further serious drop to £72 occurred, and there was little change in the situation until the end of the year which closed on a depressing note. The lower grades fluctuated more; in July the difference between No. 1 and No. 2 was £14 per ton, but this gap subsequently declined to £3. The average price for all grades over the year was £65. Even on the highly-organized and most productive estates these prices tended to be sub-marginal, and cost-cutting became the order of the day. Labour forces were reduced, and one company went so far as to employ a firm of experts to study job organization and management with initially satisfactory results.

The area under sisal at the end of 1954 was estimated at 614,889 acres, an increase of some 13,389 acres on the acreage planted at end 1953. Total production of line fibre and tow amounted to 178,250 tons compared with 168,763 tons produced in 1953. Exports were lower at 167,642 tons.

Low prices influenced planting policy, and the area of new or replantings was not so high as in the previous year; this will not be reflected in the production figures for some years, but lower production may possibly result from some of the least efficient estates ceasing to operate.

Dry weather on the Central Line was again responsible for lower than average yields, and one estate in Tanga Province suffered damage from aerial spraying directed against a swarm of locusts. Many companies are looking for alternative crops; in the Southern Province cashew nuts are favoured, and in Tanga some experimental plantings of pineapples were made.

One large group of estates continued to experiment with artificial drying with such satisfactory results that a large plant will shortly be in operation.

The cutting of "hedgerow" sisal which at one time threatened to interfere with the planting and after-cultivation of annual crops has, with the lower prices paid, now reverted to its rightful place as a useful reserve cash crop to which people can turn when they require money. Restrictions regarding its cutting and sale were removed in November, 1954. Some 5,100 tons were produced during the year.

The following figures show the production, quantity exported and export value of line fibre and tow during the past few years.

| *Year* | *Production* | *Export* | *Value (Export)* |
|---|---|---|---|
| | Tons | Tons | £ |
| 1950 ... | 121,598 ... | 118,909 ... | 11,846,057 |
| 1951 ... | 145,223 ... | 142,106 ... | 23,689,454 |
| 1952 ... | 162,185 ... | 156,167 ... | 21,708,053 |
| 1953 ... | 168,763 ... | 171,151 ... | 12,773,839 |
| 1954 ... | 178,250 ... | 167,642 ... | 10,902,109 |

The report of the Sisal Research Station at Mlingano is printed in Part II of this report.

## Coffee

*Milds.*—The 1953/54 arabica crop processed by the wet pulping method showed a considerable increase over the previous year's figures in volume and total value. The Kilimanjaro Native Co-operative Union delivered a total crop of 6,252 tons (hulled) coffee (5,988 tons clean plus 264 tons hulled "buni" i.e. hulled sun-dried berries). The crop was sold on the Moshi auctions for a total of £3,720,000 which constituted a record in volume and value, the average price for clean coffee being just over £594 per ton.

A very satisfactory crop was produced in the Rungwe District of Southern Highlands Province which amounted to 535 tons. This was handled by the Rungwe Native Co-operative Union and was sold on the Moshi auctions for a total of £353,218 at an average price of £623 per ton. The record price for coffee sold on the Moshi auctions was obtained by a parcel of coffee from Songea District in the Southern Province which fetched £655 per ton. The total crop from the Southern Province amounted to 320 tons and since there has been much new planting in recent years this amount is likely to be increased.

The non-African crop produced by members of the Tanganyika Coffee Growers' Association was 1,681 tons clean coffee.

The sharp rise in prices of Arabica coffee has been responsible for considerable areas of new planting; there has been a brisk demand for seed of high-yielding clones from the Coffee Research Station, Lyamungu, and since far better attention is now being given to the coffee crop than formerly it is expected that over-all production from the Territory will increase in the next few years.

In the Kasulu highlands of the Western Province all the seedlings from the Native Authority nurseries were avidly taken up and further large batches of seed were sown. Coffee should prove an excellent cash crop for this rather backward area, and every endeavour is being made to ensure that the industry is founded on sound lines.

The increasing spread of self-reliance among some local tribes has in the past few years led to an unwillingness to accept advice from official sources, particularly when such advice involves hard work. Consequently coffee culture in the developing parts of the Southern and Southern Highlands Provinces has not been of the standard which could be desired. This fact has now been realized by the cultivators themselves and as a result they have been sending selected men of their own for training at the Kilimanjaro Native Co-operative Union school in Moshi: in the meantime they have temporarily imported instructors from the Chagga tribe, and noticeable improvements are taking place.

White stem borer continued to be a major pest in many areas. During the year a system of control using Dieldrin, which had shown promise on a small scale, was extended to several large experimental blocks on private estates.

*Hards*.—The so-called "hard" coffee crop prepared by hulling the sun-dried coffee cherry comes mainly from Bukoba. The Bukoba crop was a good one although early estimates had to be reduced on account of drought in January and February. Despite continuous advice and exhortation by extension staff it must be admitted that the Bukoba crop is still far poorer in quality than it should be, chiefly as a result of picking unripe cherry, improper drying, hulling wet cherry in primitive wooden hullers, inadequate control of *Stephanoderes* and poor and prolonged storage. Cultural practices taught with only moderate response are mulching, pruning, plant sanitation, harvesting at the correct stage and thorough drying.

Actual figures of the Lake Province coffee crop are not yet available but it is estimated that the following amounts of hulled coffee were produced in 1954:—

| | Tons |
|---|---|
| Robusta coffee, African grown ... ... | 6,000 |
| Robusta coffee, estate grown ... ... | 1,000 |
| Arabica coffee, African grown ... ... | 4,000 |
| Arabica coffee, estate grown ... ... | 290 |

The above figures include the 282 tons of hulled sun-dried Arabica coffee (216 tons of Grade I and 66 tons of Grade II) marketed by the Bugufi Co-operative Society in Ngara District. This coffee fetched for producers the very satisfactory prices of Shs. 4/- per pound for Grade I and Shs. 3/50 per pound for Grade II.

Small quantities of both Arabica and Robusta coffee were produced in Tanga Province and since prices paid at present are very attractive to growers there has been much planting of new areas.

The report of the Coffee Research Station, Lyamungu, is printed in Part II of this report.

## Cotton

The cotton crop grown in Tanganyika during 1954 constituted a record in the area planted and the total yield obtained. The greatest part of this increase took place in Lake Province where as a result of a combination of factors such as the higher prices paid to growers and their announcement early in the season, favourable climatic conditions, the use of improved seed and better cultivation by growers the highest recorded crop of over 91,000 bales of cotton

lint was produced. In the Lake Province in 1954 there were 159,610 cotton growers cultivating 216,450 acres—an average of 1·36 acres per grower; this compares with 90,000 acres planted in 1953. The crop was undoubtedly reduced by the severe drought in March but favourable late rains enabled a good top crop to be reaped. Many growers are already aware of the benefits of better cultivation and greater attention is now being paid to early planting and early weeding and to tie-ridging of land. For the past two seasons fertilizer plots on a simple plan have been laid down on an extensive scale on African holdings. Three plots consisting of control, phosphate and phosphate-plus-nitrogen are planted under supervision on approximately 600 sites. In both seasons phosphate has given a highly economic return, but although the extra nitrogen in most cases increased the crop still further there is some doubt as to whether it can be recommended as a commercial proposition. These plots have aroused widespread interest, and it is probable that the co-operative societies will soon undertake to supply their members with superphosphate: this step will receive official encouragement but only as a means for eking out the supply of dung which is still regarded as being of prime importance.

The most recent issue of seed in bulk form (UK 51) yielded even better than expected: the 2,480 tons of seed of this variety was grown exclusively in the Geita District, in Mwanza District except Nassa, and in the Nyambiti zone. The remainder of the Lake Province was supplied with seed of UK 48. A more recent issue, UK 53, was bulked on Kome Island but it is doubtful at present whether this variety is a sufficient improvement on UK 51 to justify further multiplication. To control Blackarm (Bacterial Blight) Perenox was dusted on 2,200 tons of seed for the 1954 crop and for the 1955 season the entire seed requirement of 4,700 tons has been so dusted. Perecot will probably be used in future since it sticks better to the fuzzy seeds. Agrosan GN gave still better results in the control of Blackarm but this material is regarded as too dangerous for general use.

American Bollworm (*Heliothis armigera*) was the main cause of the shortfall of 2,500 bales in the estimated crop for Musoma District. The early planting of maize to relieve local food shortages tended to build up the American Bollworm population which migrated to the cotton when the maize crop was harvested. Cultivators were encouraged to plant maize at intervals of about a month to provide a crop more attractive than cotton to the Bollworm. Jassid was locally severe in young plants and in the young leaves produced after the drought.

In the Eastern Province, despite a definite increase in the area planted to cotton the total crop produced was less than in 1953; the main reason for this was undoubtedly late planting, the effects of which were accentuated in a year of unsatisfactory weather conditions. For the 1955 season an intensive propaganda programme backed by illustrated leaflets is being directed towards early clearing of land and early planting of cotton fields, and given reasonable weather conditions the 10,000-bale mark should easily be exceeded in 1955. Multiplication of the variety 47/10 originally developed at the Ilonga Research Station was undertaken in the Duthumi zone of Morogoro District. The resultant crop produced 190 tons of seed, sufficient for planting requirements in the Morogoro and Duthumi zones in the coming season. The higher yield of 47/10 over Eastern Province "local" is sufficiently noticeable in the field to have created a demand for it among African growers. The only serious disadvantage from

which it suffers is its low ginning out-turn of about 29·25 per cent; on the other hand, its vigour, yield per acre, lint quality, including freedom from seed nep make it a very desirable type of cotton. It is therefore satisfactory to know that derivatives of 47/10 undergoing trial and re-selection at Ilonga Research Station show promise of greatly improved lint out-turn. The results of insecticidal dusting trials carried out at Ilonga Research Station and in the field indicate that while the application of insecticides produced a significant increase in yield in most cases, the increase was only economic on early-planted, well-cultivated cotton. During the coming season dusting trials are being undertaken to enable the economic aspect to be studied more closely.

In the Southern Province the total crop of seed-cotton purchased amounted to 146,223 kilos (equivalent to 268 bales)—a slight reduction on the 149,285 kilos of seed cotton purchased in 1953. Late planting is regarded as the main cause of low yields in this Province and a big drive is being made in the coming season to have all cotton planted by 7th January. For this crop only UK 48 seed originally derived from the Lake Province will be sown.

In the Northern Province the crop grown in Moshi and Arusha Districts showed an increase—largely on account of the inducement of higher prices paid.

Buying of the Tanga Province crop was still in progress at the end of the year; the crop is estimated at 300 tons of seed-cotton—a reduction of roughly 100 tons on the 1953 crop this reduction being caused largely by late planting.

Ginning of the crop is not yet complete and although the 1954 figures must still be regarded as estimates they are given for comparison with previous years:—

| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 (Estimate) |
|---|---|---|---|---|---|
| Lake ... | 38,905 | 42,349 | 70,298 | 38,600 | 91,000 |
| Eastern ... | 8,433 | 3,047 | 6,723 | 9,927 | 8,750 |
| Northern ... | 1,356 | 1,970 | 562 | 1,864 | 2,000 |
| Tanga ... | 849 | | | | 560 |
| Southern ... | 172 | 145 | 179 | 247 | 268 |
| Total ... | 49,715 | 47,511 | 77,763 | 50,638 | 102,578 |

All figures are in bales of 400 lb.

Sales of cotton-seed for milling locally or for export are also controlled by the Lint and Seed Marketing Board. In 1954 these sales totalled 27,915 tons.

The report of the Ukiriguru Agricultural Station, Lake Province and that of the Ilonga Research Station, Eastern Province, are published in Part II of this report.

## Copra

Only moderate progress can be recorded during the year under review in the care of coconut plantations and the improvement of quality in copra. At the present time the production of cashew nuts is a more attractive proposition in parts of the coastal belt with the result that still less attention is paid to the coconut crop.

The coconut planting bonus scheme has made most progress in Tanga Province where some 884 acres have now been planted with this form of assistance. The corresponding figure for the Eastern Province is 603 acres and for the whole of the Territory 1,487 acres.

In the Eastern Province the bulk of the copra produced continued to come from Mafia Island where there was continued improvement in the quality sold since buyers there are more discriminating in the purchases they make. On the mainland, buyers are satisfied with copra of indifferent quality for soap manufacture and the premium obtainable for higher grades is seldom sufficient to warrant the additional trouble and loss of moisture.

In Tanga Province higher prices were obtained for kiln-dried than for sun-dried copra throughout the year, and as a result eleven African growers have built or have started building kilns during the year. Prices during the year have varied between Shs. 15/- and Shs. 19/50 per frasila of 36 lb. for sun-dried and Shs. 20/- to Shs. 22/- for kiln-dried copra.

*Theraptus*.—There was again a very heavy loss of potential crop from premature nut fall caused by *Theraptus* sp. and other insects. Control measures are being investigated in Zanzibar, but although some progress can be recorded it is not yet possible to make firm recommendations for insecticide application on a commercial scale. There is some doubt whether the palms under local conditions of soil and rainfall could sustain heavier bearing over prolonged periods, and it is probable that a far higher standard of cultural practice will have to be introduced *pari passu* with insect control operations.

Copra marketed by native and non-native growers in the last few years is shown in the following table:—

| | Tons | | | | |
|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Eastern ... | 5,508 | 3,991 | 9,988 | 5,856 | 7,299 |
| Tanga ... | 4,557 | 3,518 | 4,081 | 5,821 | 4,794 |
| Southern ... | 943 | 1,076 | 824 | 419 | 495 |
| Total ... | 11,008 | 8,585 | 14,893 | 12,096 | 12,588 |

An account of the work on coconuts at the Coast Agricultural Station Chambezi, appears in Part II of this report.

## Cassava

Throughout 1954 stress was again placed on the need to plant up adequate areas of cassava in all Provinces as an insurance against food shortage. The value of cassava in alleviating local food shortages was amply demonstrated during the past year and renewed efforts were made at the end of the year to restore the acreage dug up for consumption.

Greater attention is now being given to the distribution of mosaic-resistant cassava varieties but further testing of the newer strains is necessary in the areas in which they are ultimately to be grown. There is need for a mosaic-resistant bitter cassava to minimize damage in the field by vermin, since "Liongo" the main bitter variety grown at present is invariably heavily infected with mosaic. This work has already been put in hand and the resultant strains will be available for testing in the field soon.

In the Lake Province the transport of cassava cuttings from areas of plenty to areas of shortage was organized by Field Officers who also organized vermin destruction campaigns to reduce damage by vermin in the field.

Although the Southern Province continued to export dried cassava root for overseas markets these exports were on a much reduced scale compared with previous years since with the increase in the cashew crop greater quantities of cassava are required for food locally. There was the further difficulty in ensuring that consignments of cassava root were free from weevil; and since dried cassava is apparently again available in free supply from Indonesia, overseas buyers could afford to be more discriminating in their purchases. Plans are on foot for setting up a fumigation service to deal with cassava exported from the Southern Province.

The amounts of dried root sold by growers on local markets were:—

| | Tons | | | | |
|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Southern ... | 1,251 | 8,894 | 26,000 | 8,044 | 4,297 |
| Western ... | 1,751 | 2,340 | 3,150 | 3,423 | 4,243 |
| Eastern ... | 19 | 112 | 127 | 236 | 487 |
| Central ... | – | 31 | – | 606 | 20 |
| Lake ... | 30 | 17 | – | – | 37 |
| Total ... | 3,052 | 11,394 | 29,277 | 12,309 | 9,084 |

## Castor Seed

Castor remains as popular a crop as ever in areas of marginal rainfall but with the greatly reduced rains obtained in these marginal areas in 1954 many of the new plantings made received a severe set-back although the crop harvested from mature plants was not seriously reduced. The Central Province which previously gave the highest tonnage of all, increased production during 1954 although this did not reach the peak crop of 1952. It is generally recognized that the interplanting of castor in food crops has a marked adverse effect on the yields of food crops and for this reason in many places local rules have been drawn up forbidding the interplanting of food crops and castor.

Prices remained steady throughout the year at £45–£47 per ton c.i.f. representing a price of just over £30 per ton to the grower.

A start has been made to collect and compare the different varieties which are grown in various parts of the Territory. To date very little work has been done on the oil content of castor seed and the trade shows no discrimination on this score. Preliminary analysis, however, indicates that very large varietal differences occur and there is a possibility that altitude also plays an important part.

Quantities marketed in the various provinces are:—

| | Tons | | | | |
|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Eastern ... | 1,046 | 820 | 1,664 | 1,261 | 902 |
| Central ... | 652 | 1,621 | 2,823 | 798 | 1,191 |
| Southern ... | 151 | 374 | 609 | 1,978 | 805 |
| Southern Highlands | — | 600 | 635 | 476 | 192 |
| Tanga ... | 111 | 400 | 400 | 398 | 230 |
| Northern ... | 30 | 100 | 1,108 | 1,230 | 1,035 |
| Western .... | — | 10 | — | — | 73 |
| Total ... | 1,990 | 3,925 | 7,239 | 6,136 | 4,428 |

## Cashew Nuts

The increase in the cultivation of the cashew crop in Tanganyika can only be described as phenomenal. The reasons for this are not far to seek—the crop does well in the light sandy soils of the coastal belt, the trees are comparatively easy to grow and the crop is easy to harvest since the fruits should be allowed to fall to the ground and should not be picked from the tree, otherwise quality is seriously affected. Part of the popularity of the crop is that to date no control measures for sanitation or quality have been deemed necessary. The largest increase of all has taken place in Southern Province where a record crop of 11,500 tons was harvested in 1954; considerable new areas both on estate scale and on African holdings are due to come into bearing and this figure is likely to be exceeded in the near future. The crop is also increasing in extent in Eastern Province—largely at the expense of coconut planting.

Formerly, there was little mention of plant pests and disease but now that acreages of cashew have increased enormously, damage by pests and disease is much more noticeable. *Helopeltis bergrothi* causes a die-back in the new growth which bears the flowers and fruit; satisfactory control has been obtained in the Lindi area using a D.D.T. spray emitted from a "Swingfog" machine. Damage by *Theraptus* has been reported from the Eastern Province. Reports have also been received of a die-back suspected to be caused by *Botryodiplodia theobromae* and a root disease the effects of which are similar to "Sudden Death" in cloves; the cause of this latter disease is not yet known although a species of *Cytonaema* is suspected.

In the Southern Province the crop rotation practised by African cultivators used to end with three years under cassava after which the land reverted to a bush fallow. Now, cashew is planted after the cassava crop is dug up; the system is certainly far more profitable than allowing the land to revert to bush fallow, but the long-term effects on soil fertility and erosion have yet to appear.

Complaints regarding the quality of the nuts are periodically received from India, and inspection of consignments leaving Mtwara reveals that appreciable improvements are desirable. There appear to be two main causes for poor quality. In the first place much of the African crop is mortgaged to traders with no quality stipulations, and secondly apples which fall to the ground do not yield such a good fermented liquor as those picked off the tree with the consequence that many unripe nuts are harvested. Nuts also lose quality by being left too long on the ground especially in wet weather.

Prices paid to growers in 1954 have reached as high as 72 cents per kilogram although average prices throughout the season were between 55 cents and 60 cents per kilo.

Most of the crop is still exported to India for shelling but a new factory is being built at Mtwara which should cope with roughly 3,000 tons of nuts per annum.

Sales of unshelled nuts in the various Provinces amounted to:—

| | Tons | | | | |
|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Eastern ... | 1,117 | 1,073 | 1,745 | 1,297 | 1,658 |
| Southern ... | 4,787 | 5,308 | 9,064 | 8,768 | 11,500 |
| Total ... | 5,904 | 6,381 | 10,809 | 10,065 | 13,158 |

## Groundnuts

The importance of groundnuts as an export crop has declined from its pre-war eminence. In the Lake Province it has been superseded by cotton and in the Western Province "rosette" disease has become more prevalent. Local oil mills are also crushing larger quantities than previously. The season was more propitious than in 1953 and production would probably have been larger if cultivators had not consumed a large part of their seed supply in the lean times at the end of 1953.

Remarkable progress in seed selection on the Overseas Food Corporation farms at Nachingwea coupled with sound field management produced an overall yield of some 950 lb. of shelled kernels per acre.

The following quantities passed through the markets:—

| | Tons | | | | |
|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Western ... | 475 | 1,301 | 5,461 | 389 | 1,131 |
| Central ... | 383 | 1,183 | 2,590 | 388 | 654 |
| Lake ... | 296 | 1,051 | 2,199 | 20 | 843 |
| Southern ... | 21 | 900 | 632 | 406 | 1,480 |
| Total ... | 1,175 | 5,525 | 10,882 | 1,183 | 4,108 |

The following quantities have been exported during the last five years :—

| | Tons |
|---|---|
| 1950 ... ... | 75 |
| 1951 ... ... | 3,499 |
| 1952 ... ... | 9,435 |
| 1953 ... ... | 1,088 |
| 1954 ... ... | 2,503 |

## Maize, Sorghum and Millet

Increased acreages were planted to maize in most provinces and although good crops were obtained where rainfall was reasonable in amount and distribution, the marginal areas did not produce good maize crops. In the Northern Province, the amount of maize grain sold to the Grain Storage Department was the lowest for several years, largely on account of reduced yields; African growers in Moshi District tended to dispose of their crops privately to avoid payment of the cess of 2 cents per pound payable to the District Council on all sales of maize grain.

In the Eastern Province the maize crop was only moderate due to erratic rains. There was a good maize crop in the lake shore area of the Lake Province although the crop in the rest of the Province was poor. An excellent crop was obtained in the Western Province where a record surplus of over 10,000 tons of maize grain was delivered to the Grain Storage Department. Large-scale cultivation of maize in the Ismani and the Mufindi forest areas of Iringa District was mainly responsible for the very large surplus sold to Grain Storage Department (10,400 tons) in the Southern Highlands Province since the maize crop in the rest of the Province was only fair. In the Southern Province sorghum is still the main staple grown since the crop is far more suitable than maize for local conditions. An excellent crop was obtained and a surplus of some 10,250 tons of white sorghum was marketed as well as the 3,900 tons of red sorghum grown by the Overseas Food Corporation. Government purchased the 1954

crop of white and off-white sorghum at the same price as was paid for maize grain (Shs. 38/- per 200 lb. naked) but sales of sorghum have now been decontrolled and no guaranteed minimum price will be paid although growers who deliver their 1955 crops to the Grain Storage Department will receive a basic support price of Shs. 30/- per 200 lb. naked.

Widespread efforts have been made in the Eastern and Central Provinces to increase the amount of short-term sorghum grown. "Enyanza" an off-white sorghum is the most suitable variety available at present; this matures in 100–105 days compared to the 103–140 days required by local types. An even quicker-maturing variety "Tada" imported from Texas, U.S.A., has out-yielded Enyanza in trials and has matured its crop in 90 days. Bulking up is being undertaken in Morogoro District and the entire crop will be sold to the Central Province for distribution in time for the 1956 planting season. Tada is an off-white sorghum similar to Enyanza in appearance and resistance to bird attack but Africans who have undertaken palatability trials state that it has a pleasanter flavour and makes better beer. It is hoped that these attributes will serve to popularize it in both the Eastern and Central Provinces.

The introduction of short-term varieties of sorghum, however, is not the whole answer to the problem of recurrent famines in the Central Province. Such introductions must go hand in hand with better agricultural practices. In 1954, despite the low rainfall, a crop of 8 bags per acre of Enyanza sorghum was harvested on the Tribal farm at Dodoma. The crop was dry planted on tie-ridges which had been well manured with cattle manure. On a farm nearby Enyanza was planted on tie-ridges but the crop was a failure, the difference being that the seed was planted on unmanured land a day or so after the same planting rains had fallen. Tie-ridging of a portion of each field is being made compulsory in 1955 and the Field Staff are concentrating their efforts on the better farmers with a view to getting the Enyanza crop well established.

Sales of maize and sorghum by growers in 1954 amounted to:—

| | Tons | |
|---|---|---|
| *Province* | Maize | Sorghum |
| Northern ... ... | 17,173 ... | 294 |
| Tanga ... ... ... | 1,050 ... | – |
| Eastern ... ... | 6,271 ... | 1,778 |
| Central ... ... ... | 562 ... | 110 |
| Western ... ... | 10,032 ... | 1,316 |
| Lake ... ... ... | 4,429 ... | 500 |
| Southern ... ... | 4,550 ... | 14,440 |
| Southern Highlands ... | 13,399 ... | – |
| Total ... | 57,466 ... | 18,438 |

In the Lake Province the Botanist at the Ukiriguru Agricultural Station has undertaken a programme of breeding sorghum varieties suitable for local conditions. His first short-term white sorghum "SUK I" is being bulked up on 70 acres of land at Lubaga seed farm and on 20 acres of land at the Sukumaland Federation Stock Farm at Malya ; this work is being financed by a loan of £540 from the Sukumaland Central Native Treasury.

Maize rust (*Puccinia polysora*) is now present in most parts of the Territory but it has not caused so much crop loss as was at one time thought probable. Early-planted crops appear to suffer little reduction in yield although damage can be serious in later-planted fields.

Preliminary trials by the East African Agriculture and Forestry Research Organization in 1952 showed that resistance to polysora can be bred into local maize strains, and this work is now being followed up at Nachingwea where the resistance factor has been introduced into selected strains of Katumbili. Another maize breeding project made progress at Ilonga where an attempt is being made to evolve improved self-reproducing types by Brieger's method.

Stalk borer on both maize and sorghum is a serious pest in the Western, Northern and Lake Provinces. It is probable that an appreciable degree of control can be attained by thorough disposal of plant residues; this has been indicated by experience on Overseas Food Corporation farms at Urambo, and is being tested in some African areas. Insecticide investigations were planned in the Western Province and D.D.T. dust has been used successfully by Africans in the Northern Province. By completely destroying the early crop of maize seedlings on which the first generation was building up, "army worm" proved to be the most effective control yet encountered in the Western Province, but this can hardly be recommended as standard practice.

## Pulse Crops

The mixed bean crop throughout the Territory was up to average but as maize was in short supply in many areas for part of the year a greater proportion of the bean crop was retained for home consumption and sales on local markets have therefore been less. Production of white haricot beans continued in the Northern Province but there was less demand from the large canning firms for African-grown haricots on account of the lack of uniformity in consignments resulting from the bulking of small purchases from numerous growers. Uniform samples from the larger non-African growers had no difficulty in finding buyers at satisfactory prices. Sales by growers in the Northern Province in recent years have been:—

| | Tons |
|---|---|
| 1950 ... ... | 2,234 |
| 1951 ... ... | 2,086 |
| 1952 ... ... | 3,555 |
| 1953 ... ... | 2,810 |
| 1954 ... ... | 2,696 |

White haricot beans are now being grown in the Karagwe area of Bukoba District and since prices payable at present for hand-picked beans are very attractive to growers, there is every indication that much bigger areas will be planted in the coming year.

Approximately 3,900 tons of chick-pea (Cicer) were sold in Lake Province. The supply exceeded demand and prices fell towards the end of the season to 14 cents per pound.

An excellent crop of dried peas was grown in Southern Highlands Province and although prices were low at harvest time they tended to rise later and the bulk of the crop was sold for Shs. 70/- to Shs. 80/- per bag depending on distance from railhead. Owing to quarantine difficulties it has not been possible to obtain new varieties of a white or yellow pea suitable for the dried pea trade and since examination of existing strains indicates that considerable improvement could be effected by rigorous selection this course is to be followed.

The pigeon-pea crop grown in Southern Province showed a welcome increase in production after the reduced crop of the previous year. The use of pigeon-pea as a fallow crop is being demonstrated and this is expected to result in increased plantings.

Quantities of pulses marketed by growers are:—

| | | | | Tons | | |
|---|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Lake ... | 7,058 | 7,346 | 6,977 | 4,137 | 6,890 |
| Northern ... | 3,015 | 10,177 | 3,728 | 4,297 | 4,022 |
| Southern Highlands | 307 | 2,132 | 2,630 | 1,189 | 1,210 |
| Western ... | 551 | 2,061 | 1,991 | 867 | 1,754 |
| Eastern ... | 802 | 635 | 613 | 752 | 688 |
| Central ... | 89 | 176 | 160 | 15 | 31 |
| Southern ... | 2,333 | 1,833 | 4,652 | 1,076 | 2,237 |
| Total ... | 14,155 | 24,360 | 20,751 | 12,333 | 16,732 |

## Papain

Low prices prevailed throughout most of the year although the price rose to Shs. 15/- per pound in December, 1954. Established producers in Northern Province continued to market papain throughout the year, but no interest was shown in developing new plantations. In the Eastern Province only one estate remained in full production. Exports of papain are given in Appendix II to this report.

Legislation to control the marketing and grading of papain was drafted, but in the depressed state of the market the Papain Growers' Association became moribund and no further progress was made. In cases such as this where producers are not prepared to shoulder most of the responsibility for enforcing and operating rules made for their own benefit, it is not the policy of Government to impose such legislation.

## Pyrethrum

Production in Northern Province took a sharp upward turn as a result of new plantings in the Ol Molog area of Moshi District. Also, the labour supply was far more satisfactory than expected since the removal of Kikuyu labour from the Northern Province in the early part of the year did not result in as much difficulty as had been feared. In the Southern Highlands Province the seasonal flush was disappointing on account of insufficient rain followed by a long dry season; the slightly higher output resulted from newer areas coming into bearing rather than from higher yields per acre. Although Africans in Njombe again produced pyrethrum, interest appears to be waning, and the co-operative drier mentioned in my last report was not constructed.

The following table shows production of dried flowers for the past few years:—

| | | | | Tons | | |
|---|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Northern ... | 144 | 136 | 107 | 125 | 360 |
| Southern Highlands | 149 | 165 | 133 | 150 | 175 |
| Total ... | 293 | 301 | 240 | 275 | 535 |

Throughout the year discussions took place regarding the introduction of a new Ordinance to control the industry; several drafts were prepared but none was entirely satisfactory.

In the Southern Highlands experimental work was mainly directed towards elucidating the rather complex phosphate problem on the varied soil types at Uwemba. Work was also done on the establishment of leys and resting crops for restoring fertility after the pyrethrum cycle.

Very promising results were obtained by one planter in the Iringa District who has installed a dry-weather irrigation system.

Experimental work on pyrethrum is referred to in the annual report of the Agricultural Officer (Experiments) Iringa, which is published in Part II of this report.

### Rice

Though the Eastern Province crop did not come up to estimates made in the early part of the season, nevertheless the final crop can be regarded as very satisfactory in view of the patchy nature of the rainfall experienced in the coastal belt. Extensive areas of paddy in the Western Rufiji produced no crop at all owing to the absence of flooding and the poor rainfall. Much of the crop in the coastal parts of the province is grown as hill rice and the crop proved better than expected. In the Lake Province the paddy crop was severely affected by the lateness of the rains and the long periods of drought. Efforts were made to prevent the recurrence of years of low production by provision of nursery beds irrigated from dams. The ideal was achieved in the Sima Chiefdom of Ngudu District where representatives of the people took over the work of the nursery beds and issued the seedlings. The Malya Rice Scheme, where some 60 acres of paddy were grown under supplementary irrigation from the Malya Dam was most successful. Average yields were in the region of 3,500 lb. per acre. The water duty was calculated at 250,000 gallons per acre, although this may have been somewhat low for 1954. The cultivators paid Shs. 35/- per acre as water rates and their estimated profit was approximately Shs. 600/- per acre.

There was an increase in the amount of paddy produced in the Southern Highlands Province although this increase took place almost entirely in the Usangu area of Mbeya District. There, both Faya and Kahogo varieties are grown and both qualify for the Grade I price although the acreage under Kahogo is increasing at the expense of the Faya crop. In Rungwe District both Faya and Mwasungu varieties have qualified in the past for Grade I prices since Kahogo is not grown there. Sales of paddy in Rungwe District reached 5,724 tons in 1954.

Much additional land was planted to paddy in the Southern Province during the year although growers retained much of their produce and as a result sales of paddy in local markets have not shown any considerable increase. The Rovuma Valley Ploughing Scheme financed by Native Authority funds cultivated some 750 acres during 1954 although the potential area for growing paddy by mechanical cultivation is estimated at 20,000 acres.

Main areas of paddy production in Tanga Province are Pare and Lushoto Districts. Sales in Pare District were an all-time record of 2,134 tons, grown on an area of roughly 2,200 acres, but sales of paddy in the Lushoto markets were

only 187 tons although the area planted was also in excess of 2,000 acres. The very reduced sales in Lushoto markets are due to the crop being transported illegally to Mombasa for sale there.

The growing of paddy in Mechanical Ploughing Schemes is more fully dealt with in a later section of this report.

Amounts of paddy (unhusked rice) marketed by growers in recent years are:—

| | Tons | | | |
|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Eastern ... | 6,024 | 9,305 | 2,823 | 6,657 | 9,841 |
| Central ... | 20 | 23 | – | – | – |
| Southern Highlands | 3,228 | 1,336 | 3,000 | 5,769 | 6,890 |
| Southern ... | 2,783 | 2,755 | 1,392 | 662 | 1,215 |
| Western ... | 914 | 2,037 | 2,250 | 630 | 1,640 |
| Lake ... | 5,155 | 4,502 | 5,185 | 1,300 | 4,620 |
| Northern ... | 194 | 188 | 51 | 61 | 74 |
| Tanga ... | 1,622 | 1,806 | 938 | 1,750 | 2,321 |
| Total ... | 19,940 | 21,952 | 15,639 | 16,629 | 26,601 |

An account of work on paddy varieties appears in the report of the Botanist in Part II of this report.

## Sugar

Extensive surveys were conducted in the Eastern Province with a view to finding suitable land and sufficient irrigation water for large-scale enterprise. Further developments were anticipated by the planting up of a small area for multiplying planting material.

The appreciable jaggery industry in the Eastern Province suffered from a reduction in the retail price of sugar and from lack of ready cash in the Central Province which is normally the chief consuming area.

The Tanganyika Planting Company at Arusha Chini in Moshi District continued to be the only large-scale producers of plantation white (and brown) sugar. Extensions have been made to their factory and additional machinery installed to deal with the increased cane crop obtained from the new areas of land which have been planted by the firm in recent years.

Production of plantation white (and brown) sugar by this firm in the past few years is shown in the following table:—

| | Tons |
|---|---|
| 1950 ... ... | 8,055 |
| 1951 ... ... | 8,805 |
| 1952 ... ... | 9,666 |
| 1953 ... ... | 10,708 |
| 1954 ... ... | 10,732 |

## Seeds

The output of the seeds industry which is centred in the Northern Province is composed mainly of seed beans although small quantities of flower and vegetable seeds are also exported. Some excellent crops of seed beans were harvested in 1954. There was a strong demand for seed beans at the end of the year owing to poor harvests in many European countries, and prospects for this local industry appear to be excellent at present.

One of the main problems of the industry is the control of Bruchid beetles both in the field and after harvest. Many growers are now spraying their crops against this danger, and in some cases aeroplanes have been used. Unfortunately the Entomologist engaged on this work has resigned his appointment.

The Plant Pathologist whose emoluments are partly provided by the industry had a full season's work, and plans are now well advanced for instituting a voluntary certification scheme. It is however difficult if not impossible to comply with the Australian import regulations in this respect, and prolonged attempts to obtain some relaxation to suit local conditions met with failure.

Exports of seed beans in the last five years have been:—

| | Tons |
|---|---|
| 1949/50 ... ... | 1,401 |
| 1950/51 ... ... | 1,173 |
| 1951/52 ... ... | 1,251 |
| 1952/53 ... ... | 1,460 |
| 1953/54 ... ... | 1,894 |

## Tobacco

(a) *Flue-cured.*—In the Southern Highlands Province deliveries of flue-cured leaf to the Grading Sheds in Iringa amounted to 3,269,407 lb.; this constitutes a record production, the previous best being 2,863,058 lb. in 1950. A total of 5,325 acres were planted to tobacco giving an average yield of 614 lb. of cured leaf per acre. Although production greatly exceeded expectations weather conditions were far from ideal and the quality of the leaf was generally poor. Practically all flue-cured leaf in this area is still of the Ehlers variety for which there is only a limited demand. Much of this year's production was sold to tobacco factories in East Africa and a useful contract was signed with the East African Tobacco Company in 1954 to purchase a guaranteed minimum quantity of leaf at an agreed price for the next three years. During this time it is hoped that some progress will be achieved in the problem of finding or breeding varieties of Virginia tobacco suitable for local soil and climatic conditions and which are acceptable to buyers on overseas markets. An Agricultural Officer (Tobacco) who has had experience of tobacco in Rhodesia was appointed during the year; he was seconded to the Southern Highlands Non-Native Tobacco Board as Tobacco Research Officer, and took charge of the Research Station during the harvest.

Some very encouraging results were obtained from the first year's working of the Research Station. Two or three strains of Virginia leaf showed promise both from a quality and yield point of view, and they cured out very easily. There is still some way to go, however, before the optimum fertilizer practice has been worked out, and this will form the main objective of the Station for the next two or three years. A full account of the work appears in Part II of this report.

In the Western Province the Overseas Food Corporation extended their acreage under flue-cured tobacco at Urambo. The East African Tobacco Company leased the Government farm at Tumbi for developing the production of flue-cured tobacco by African growers. The company distributes seedlings free of charge and purchases ripe green leaf from growers at 10 cents, 8 cents and 3 cents per pound according to quality. So far, some 75 growers have agreed to grow a third of an acre each and if these early trials are successful and the cash returns acceptable to growers the system can be greatly extended.

The flue-cured tobacco industry in the Southern Province progressed a little, and about 74,000 lb. of cured leaf were produced in Songea and Tunduru Districts. Prices obtained by those growers who cured their crop satisfactorily were sufficiently high to attract a number of new farmers to the area. Yields of cured leaf were approximately 500 lb. per acre and at least one grower sold his entire crop at an average price of Shs. 3/30 per pound. A small experimental farm has been started at Puchapucha in the centre of the tobacco growing area in Tunduru District on which trials on the growing and curing of tobacco will be carried out. A Tobacco Officer is in residence to run the farm and advise farmers on the growing and curing of tobacco. The Mgwina area of Songea District originally proposed as a new area for the production of flue-cured tobacco did not produce any tobacco this season. The area appears to be too inaccessible to attract farmers to settle there.

(b) *Fire-cured.*—The crop grown in Songea District was much larger than expected, a total of 677 tons (1,516,480 lb.) of cured leaf being delivered to the grading sheds of the Ngoni-Matengo Native Co-operative Union at Songea. The target of production aimed at in this area is 1,000 tons of cured leaf per annum so as to bring down the cost per pound of grading and packing the crop. Eelworm is present in most tobacco fields and is likely to increase in severity unless growers give more attention to crop rotation. A Seed Farm is maintained at Songea to ensure adequate production of seed from selected plants and to conduct trials on crop rotations and the use of manures and fertilizers. It appears that the use of artificial fertilizers is not an economic proposition for African growers in Songea District at present, largely on account of transport costs.

Deliveries of fire-cured leaf to the grading sheds of the Nyamirembe Native Tobacco Board in 1954 were as follows:—

| *District* | lb. | Shs. |
|---|---|---|
| Biharamulo ... | 131,879 ... | 69,713 |
| Ngara ... ... | 18,372 ... | 8,708 |
| Kibondo ... ... | 250,078 ... | 122,988 |
| Geita ... ... | 1,005 ... | 434 |
| Total ... | 401,334 ... | 201,834 |

The leaf was re-graded and baled in the factory and 162,135 kilos sold on contract to the East African Tobacco Company, Kampala. Losses due to drying, breakages, etc., were high and arrangements have now been made for the East African Tobacco Company to accept leaf as graded at the buying posts thus eliminating re-grading costs and losses and enabling higher prices to be paid to growers. It is worthy of note that a higher return per acre can be obtained by producing coil tobacco in this area, but the market is limited.

Production of flue-cured and fire-cured tobacco in recent years has been:—

| *Area* | *Flue-Cured Tobacco (lb.)* | | | | |
|---|---|---|---|---|---|
| | 1950 | 1951 | 1952 | 1953 | 1954 |
| Iringa ... ... ... ... ... | 2,863,058 | 2,736,190 | 2,290,087 | 1,995,325 | 3,269,407 |
| Urambo ... ... ... ... ... ... | — | 40,320 | 77,045 | 188,480 | 228,863 |
| Tunduru ... ... ... ... ... | — | — | — | 22,400 | 73,920 |
| Total ... | 2,863,058 | 2,776,510 | 2,367,132 | 2,206,205 | 3,572,190 |

*Fire-Cured Tobacco (Tons)*

| *Area* | 1950 | 1951 | 1952 | 1953 | 1954 |
|---|---|---|---|---|---|
| Songea ... ... ... ... ... | 1,275 | 604 | 400 | 242 | 677 |
| Nyamirembe ... ... ... ... | 182 | 210 | 188 | 138 | 179 |
| Total | 1,457 | 814 | 588 | 380 | 856 |

## Tea

The season was again favourable to tea production and with new areas coming into bearing another record crop was produced. Tea planting licences covering a total of 1,680 acres were issued during the year. In the Mufindi area of Southern Highlands Province a new factory—the second in the area—opened on 1st March but a large quantity of leaf was lost earlier in the year because the existing factory was unable to absorb the main flush. A new factory at Kiganga Estate, Rungwe District, started operating in March. The pronounced dry season resulted in a big drop in leaf production and in some of the lower altitude areas there was severe leaf scorch. Approximately 18,000 lb. of tea seed was exported from Rungwe District, most of which went to Kenya, Uganda and Southern Rhodesia.

In Tanga Province, tea planting continued on existing areas of cleared land and new areas were cleared from forest. Production again showed an increase and would have been even higher but for the drought in July, August and September which practically brought picking to a standstill.

Figures of made tea production are:—

| *Year* | lb. |
|---|---|
| 1950 ... ... | 1,748,672 |
| 1951 ... ... | 2,383,391 |
| 1952 ... ... | 2,462,601 |
| 1953 ... ... | 2,821,245 |
| 1954 ... ... | 3,583,655 |

The acreage of tea at end of December, 1954, was 10,860 acres

## Sunflower Seed

The decline in production of sunflower seed mentioned in the 1953 report has continued in 1954 mainly on account of the low prices still paid for this crop. These low prices are largely caused by the risk of admixture of castor with sunflower seed, and since this risk still remains, Tanganyika sunflower seed does not enjoy a good reputation with overseas buyers and as a consequence prices remain low. Legislation to deal with admixture of castor with sunflower seed was introduced during the year.

Sales of sunflower seed in Produce Markets are:—

| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
|---|---|---|---|---|---|
| | | | Tons | | |
| Lake ... ... ... | 107 | 495 | 1,777 | 316 | 677 |
| Western ... ... | 630 | 1,172 | 6,028 | 446 | 1,512 |
| Eastern ... ... | 623 | 816 | 1,303 | 568 | 658 |
| Central ... ... ... | 202 | 149 | 265 | 80 | 155 |
| Southern Highlands ... | 1,194 | 800 | 960 | 160 | 355 |
| Northern ... ... | 1,186 | 1,237 | 738 | 420 | 594 |
| Tanga ... ... ... | – | 350 | 179 | 216 | 93 |
| Total ... | 5,201 | 6,423 | 13,204 | 2,819 | 4,044 |

## Sesame

There was an increase in production of sesame in the Southern Province which has been the main producing area for some years, and so long as prices remain at their present levels the crop can compete with other cash crops in that area. Flea-beetle causes much damage to the young plants and dusting is being tested on an experimental basis.

Sales in produce markets have been:—

| | | | | | Tons | |
|---|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Southern ... ... | 1,740 | 3,145 | 1,549 | 1,286 | 2,490 |
| Eastern ... ... | 385 | 279 | 286 | 229 | 184 |
| Lake ... ... ... | 12 | 37 | 64 | 3 | 33 |
| Total | 2,137 | 3,461 | 1,899 | 1,518 | 2,707 |

## Wheat

The 1954 wheat crop in the Northern Province was very good, the short-rains crop in the Ol Molog area amounting to 2,076 tons and the main rains crop from the entire province to 9,320 tons. Losses by grain-eating birds were severe only on the short-rains crop. Over 1,000 tons of wheat were produced by Africans in Mbulu District where neighbouring European farmers assisted production by hiring out machinery for cultivating the land and reaping the crop.

In Southern Highlands Province although the crop showed a slight increase over the previous year it is obvious that interest in the crop has waned and the amount of wheat grown locally is no longer sufficient for the Province's own requirements. The yields obtained from the infertile soils found in many parts of the Province are low. The application of artificial fertilizers alone is no solution to this problem; good yields have resulted on an experimental scale from the application of dung alone or dung plus fertilizers, but this practice has not been taken up on a farming scale.

There was a considerable increase in the crop grown in the Songea District of Southern Province although there was some difficulty in marketing it, since the Peramiho Roman Catholic Mission which previously purchased the entire crop grown in the district only purchased enough wheat grain for their own requirements.

The amounts of wheat grain marketed in the past few years are:—

| | | | | | Tons | |
|---|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Northern ... | 7,475 | 4,902 | 4,465 | 4,301 | 9,320 |
| Southern Highlands ... | 361 | 380 | 246 | 66 | 100 |
| Southern ... ... | 203 | 542 | 553 | 600 | 350 |
| Western ... ... | 13 | 11 | – | 7 | – |
| Total ... | 8,052 | 5,835 | 5,264 | 4,924 | 9,770 |

Experimental work on wheat is dealt with in the report of the Agricultural Officer (Experiments), Iringa, published in Part II of this report.

## MINOR CROPS

### Barley

There was a much smaller crop in the Northern Province on account of lower prices for all but malting barley. The crop grown mainly by Africans in Southern Highlands Province showed some increase but most of this was sold to local farmers for use as pig feed.

Sales in recent years have been:—

| | Tons |
|---|---|
| 1952 ... ... | 250 |
| 1953 ... ... | 2,384 |
| 1954 ... ... | 918 |

### Cinchona Bark

There was a revival of interest in this product chiefly as a result of higher prices offering. The production of bark all of which came from four estates in the Usambaras, was 111 tons, the highest for many years. Further areas are available for the production of bark should prices remain attractive.

Production figures are:—

| | Tons |
|---|---|
| 1952 ... ... | 53 |
| 1953 ... ... | 4 |
| 1954 ... ... | 111 |

### Derris Root

The growing of this crop is confined to one estate in the Eastern Usambaras which produced $3\frac{1}{2}$ tons of dried root during the year. The crop is interplanted between rows of oil palms.

### Essential Oils

Five thousand pounds weight of Bitter Orange Oil were distilled by one estate in Tanga District, although this is only about a fifth of the potential production from this plantation. In the Uwemba area of Southern Highlands Province the areas planted to Geranium (50 acres) and *Eucalyptus citriodora* (5 acres) remained the same although production of essential oil was on a much reduced scale owing to the long dry season.

### Spices

A record amount of seven tons of black pepper was produced on the one estate in Tanga Province growing the crop. Attempts were made to interest Africans in the growing of pepper by the sale at cost price of pepper plants but these attempts so far remain unsuccessful even although conditions are suitable and the crop grows well in the area. Ten tons of chillies were produced in 1954.

### Palm Oil and Palm Kernels

Production from the one estate in Tanga District amounted to 35 tons of red palm oil and 24 tons of palm kernels. In the other main producing area in the Territory—the lake shore area of Lake Tanganyika—some 110 tons of red palm oil and 492 tons of palm kernels were marketed by growers although total production of both palm oil and palm kernels was far higher.

There are few contiguous areas in the Territory where the crop can be grown on a plantation scale, but there is room for a large extension of the peasant industry in the Kigoma District. Seed of the Malayan "dumpy" type was established on a small demonstration plot where other improved strains came into bearing. The crop also shows promise along the edges of valley bottoms in the Southern Province, and multiplication nurseries are being established for distributing seedlings.

Total sales recorded have been:—

| | Tons | | | | |
|---|---|---|---|---|---|
| | 1950 | 1951 | 1952 | 1953 | 1954 |
| Palm Kernels | 225 | 370 | 334 | 499 | 512 |
| Palm Oil | 56 | 60 | 35 | 64 | 145 |

## Cacao

Three tons of beans were produced on the one estate in Tanga Province growing the crop. Seed was supplied to another estate in the area which proposes growing a comparatively large area of the crop.

## Kapok

Production was confined mainly to non-native estates in the Tanga and Eastern Provinces, although Africans are now taking an interest in the crop. To encourage planting of the crop by Africans one non-native estate owner in Tanga District has issued seedlings free for several years.

Production figures are:—

| | Tons | | | |
|---|---|---|---|---|
| *Province* | 1951 | 1952 | 1953 | 1954 |
| Tanga | 191 | 167 | 320 | 110 |
| Eastern | 135 | 276 | 420 | 424 |
| Southern | – | – | – | 45 |
| Total | 326 | 443 | 740 | 579 |

## Gums (Arabic and Copal)

Collection of gum arabic is confined almost entirely to the dry areas bordering the Lake and Western Provinces and to Central Province. Heavy sales in any one year are generally indicative of a poor year for annual crops, and the unusually heavy sales in the Central Province are some measure of the seriousness of the food shortage there.

Recorded sales of gum arabic in local markets are:—

| | Tons | | | |
|---|---|---|---|---|
| *Province* | 1951 | 1952 | 1953 | 1954 |
| Lake | 245 | 148 | 232 | 256 |
| Western | 228 | 206 | 373 | 397 |
| Central | 85 | 58 | 97 | 193 |
| Total | 558 | 412 | 602 | 846 |

The collection of gum copal declined further during the year and only negligible amounts were sold.

## Rubber

Production from the 176 acres of Hevea rubber on an estate in Eastern Province declined still further to 20 tons compared to 50 tons produced in 1948.

## Betel Nut

The crop is grown almost entirely by Arabs near the mouth of the Pangani river. Production is increasing owing to new areas coming into bearing.

Figures of exports are:—

| | Tons | |
|---|---|---|
| 1952 | 1953 | 1954 |
| 71 | 71 | 81 |

## Onions

Increased areas of land were prepared for the planting of onions but there was some difficulty over seed supplies and production suffered as a result.

Amounts marketed in recent years were:—

| | | | | | Tons | | |
|---|---|---|---|---|---|---|---|
| *Province* | 1950 | 1951 | 1952 | 1953 | 1954 |
| Northern | 1,320 | 1,265 | 1,763 | 1,460 | 1,603 |
| Eastern | 263 | 174 | 134 | 157 | 70 |
| Central | 640 | 924 | 261 | 200 | 317 |
| Lake | 148 | 38 | 2 | – | 250 |
| Total | 2,371 | 2,401 | 2,160 | 1,817 | 2,240 |

In the Usangu area of Mbeya District some Baluchi farmers who have been producing their own seed supplies for some years have been persuaded to increase their production to provide seed supplies for local growers. Some 200 lb. of seed were produced in 1954. An Egyptian-type of onion is grown as this keeps better in storage than the Bombay Red variety, seed of which is imported annually from India.

## Sweet Potatoes

The crop is grown mainly by Africans for home consumption although there is a ready sale in towns for any surplus production. Large areas are planted up in swamps and valley bottoms every year after the end of the rainy season.

## European Potatoes

Acreages planted to the crop were about average and although supplies were adequate to meet local requirements the quality of the crop marketed was often poor. Since 1954 was a dry year the incidence of Late Blight (*Phytophthora infestans*) in the commercial crop was low. Production in Morogoro District was sufficient to supply the bulk of the requirement on the Dar es Salaam market and consequently the main outlet for the surplus crop in Mbeya District was in Northern Rhodesia. Accurate figures of the amounts of potatoes marketed are not available since a considerable amount of the crop is now transported by road but the following figures give some idea of the amounts involved:—

| | | | Tons | |
|---|---|---|---|---|
| *Province* | 1952 | 1953 | 1954 |
| Tanga | 150 | 300 | 300 |
| Northern | 345 | 340 | 800 |
| Central | 15 | 10 | 10 |
| Eastern | 105 | 32 | 91 |
| Southern | 26 | 22 | 50 |
| Southern Highlands | 1,155 | 1,013 | 770 |
| Lake | 84 | – | 400 |
| Total | 1,880 | 1,717 | 2,421 |

The work of importing and testing blight-resistant strains of potatoes was continued at the Kungului farm at Lushoto and since Leaf Roll Virus is endemic in the Lushoto area arrangements have been made to multiply any suitable blight-resistant strains in Moshi District after they have been thoroughly tested out at Lushoto. Fresh seed is of course imported for the multiplication plots. The most suitable strain so far imported from the Scottish Plant Breeding Station, Edinburgh, is 1521c (3) and small quantities of this from the Moshi multiplication plots have now been sent to all provinces for bulking up locally. This strain has been grown for six years at the Kungului farm, Lushoto (two crops per year), and has shown no sign of Late Blight so far. The next best strain 1564a (14) went down to a new strain of Late Blight in 1954 for the first time after being imported six years ago. Considerable quantities of seed of 1521c (3) have already been distributed throughout Lushoto District.

## Vegetables

Morogoro and Iringa Districts continue to be the main areas of production of vegetables for the Dar es Salaam market while the Lushoto area similarly supplies Tanga and the rest of Tanga Province. There was the usual glut of green vegetables in the cool season but supplies at other times of the year were often inadequate. The service of insulated trucks on the Central Railway Line was of great value to vegetable growers in Iringa District who can now market their vegetables in Dar es Salaam with a minimum of loss and at a competitive price. The transport of vegetables by air from Iringa District to Dar es Salaam has virtually ceased.

## Fruit

(a) *Citrus*.—Sales of oranges in the Muheza area of Tanga District showed a slight increase as a result of the increased price obtainable since buying ceased to be a monopoly. Production figures and prices paid to the producer since 1948 were:—

| *Year* | *Production (Tons)* | *Price per 1,000 lb.* Shs. | |
|---|---|---|---|
| 1948 ... ... ... | 1,546 | 15/- | Average |
| 1949 ... ... ... | 1,204 | 17/56 | Fixed |
| 1950 ... ... ... | 1,780 | 17/36 | |
| 1951 ... ... ... | 422 | 17/56 | |
| 1952 ... ... ... | 739 | 17/56 | |
| 1953 ... ... ... | 820 | 30/- | Average |
| 1954 ... ... ... | 976 | 33/- | Average |

Of this year's crop 265 tons were purchased by Federal Products for juice extraction at Muheza, 382 tons were railed to Nairobi (mainly for juice extraction) and the remainder to nearby towns for sale as fresh fruit. As a result of the Eastern Usambara Land Utilization Survey carried out during the year it appears that the biggest obstacle to improvement or extension of orange growing in the Muheza area is the present system of land tenure. In this system most of the orange plantations are leased by absentee African landlords, for picking only, to tenants of alien tribes, who do no weeding, neither are they allowed to plant nor fill in the gaps caused by trees being killed off by grass fires.

(b) *Bananas*.—The Arabs of Pangani District who grow bananas as a cash crop found increasing difficulty in finding a market for their crop since the prices obtainable at Mombasa scarcely paid for transport of the crop. This fall in price has been brought about by plantations on the Kenya coast coming into bearing. Exports in the past have been:—

| *Year* | *Tons* | *Year* | *Tons* |
|---|---|---|---|
| 1949 ... ... | 1,745 | 1952 ... ... | 860 |
| 1950 ... ... | 1,698 | 1953 ... ... | 529 |
| 1951 ... ... | 1,250 | 1954 ... ... | 330 |

(c) *Pineapples*.—Plantations have now been established by three non-natives and several Africans in the Muheza area of Tanga District. Yields are good if sulphate of ammonia to the order of 400 lb. per acre is applied annually, but as it is not yet known whether the canned product will be acceptable on export markets no official encouragement is being given to Africans at present to plant the crop.

(d) *Passion-fruit*.—Sales of African-grown fruit to Messrs. Tanganyika Passion Fruit, Ltd., Lushoto, during the 1954 season for juice extraction again showed a slight increase at 58 tons against 46¾ tons sold in 1953 and 23½ tons in 1952.

(e) *Deciduous fruit*.—A fruit tree nursery has been started at Malindi under the ægis of the Usambara Scheme to extend the planting of deciduous fruit trees to interested African growers.

Only types which can be propagated from cuttings or seed are being grown at present until such time as growers are able to look after grafted or budded plants.

### Colombo Root (*Jateorhiza palmata*)

The revival in exports of this crop in 1953 has been short-lived and exports in 1954 fell to 10 tons largely on account of the presence of much weevil-infested root which was unacceptable to buyers.

Export figures are:—

| *Year* | *Tons* |
|---|---|
| 1951 ... ... ... | 93 |
| 1952 ... ... ... | 12 |
| 1953 ... ... ... | 177 |
| 1954 ... ... ... | 10 |

### Beeswax and Honey

On 1st July the Beekeeping Division came under the ægis of the Forest Department.

### Production Committees

Production Committees which were established under the Crops (Increased Production) Ordinance continued to operate successfully in the Districts of Arusha, Moshi, Mbulu (Northern Province), Morogoro and Kilosa (Eastern Province), and Iringa (Southern Highlands Province).

Planting Orders which carry with them Guaranteed Minimum Returns of Shs. 100/- per acre for maize or wheat were issued in respect of 51,583 acres of maize and 15,486 acres of wheat on the advice of Production Committees. Claims for Guaranteed Minimum Returns in respect of the 1954 season amounted to £ 42,490.

It was decided during the year that the Crops (Increased Production) Ordinance would be prolonged until 31st December, 1955, after which date it would not be renewed. When announcing its decision to terminate this legislation Government paid tribute to the services rendered by Production Committees during the life of the Ordinance. It also emphasized that although Planting Orders would no longer be issued it saw no reason for changing the present system of announcing a fixed guarantee price to maize and wheat producers. The Tanganyika Government is at present committed to automatic parity with Kenya in respect of wheat (but not maize) prices.

## MECHANIZATION AND MECHANICAL PLOUGHING SCHEMES

The aim during the year has been to consolidate the gains made in experimental and pilot schemes and to put these schemes on a more economic basis.

The Mechanization Scheme in the Lake Province controlled by the Lake Province Cotton Committee and financed by the Lint and Seed Marketing Board has up till now been engaged both on experimental work and also in ploughing the small and scattered plots of African cultivators. Costs of ploughing were unduly high since the units were spending half their working hours moving from place to place, finding the cultivator and his plot, measuring the area, obtaining payment, and turning the tractor and plough at head lands. Also, most cultivators wanted their land ploughed in October or November each year. The arrangement now made is that Native Authorities with the assistance of Field Staff select block areas suitable for mechanical ploughing and collect the combined prepaid fees. Field Staff then mark and measure the areas and the Mechanical Units merely do the ploughing and move on to the next block. Instead of the flat rate charged for ploughing in the past, the charges now levied are graduated to encourage aggregation of holdings for economical ploughing as the following table shows:—

| | *Ploughing* | *Ridging* | *Discing* |
|---|---|---|---|
| Ploughing blocks over 10 acres ... ... | ... 40/- ... | 45/- ... | 30/- |
| Ploughing blocks 5-10 acres ... | ... 50/- ... | 55/- ... | 40/- |
| Ploughing blocks under 5 acres ... ... | ... 60/- ... | 65/- ... | 45/- |

All ploughing done before the end of August in any year, however, is charged at Shs. 40 - per acre to encourage the spread of the ploughing season. Several serious difficulties in the Mechanical Ploughing Scheme still remain—the excessive wear and destruction of tyres, the irresponsibility of unsupervised African staff, the unwillingness of the people to aggregate plots for ploughing and the intractability of certain soils.

In the Eastern Province the main activity continued to be the Rufiji Ploughing Scheme, the aim of which was the cultivation of land for paddy growing. Instead of attempting to aggregate existing holdings the scheme was fortunate in that considerable areas of uncultivated land suitable for paddy cultivation were available. Here, as in the Lake Province the Native Authority collects the prepaid ploughing fees and staff of the Ploughing Scheme merely have to mark, measure and plough the land. The heaviest single charge against the scheme is that of depreciation which amounts to Shs. 15/- per acre, and is largely responsible for the need to raise the ploughing fees from Shs. 40/- to Shs. 60/- per acre in 1955. At present the scheme uses track-laying tractors of American

origin but consideration will have to be given to replacing these with lighter and less expensive tractors from the United Kingdom for although these would have a lower ploughing output per hour they would have the advantages of lower depreciation and cheaper spare parts. A total of 6,400 acres were ploughed during the past season; this represents 850 acres per tractor which would be a reasonable figure if other work could be found for the tractors during the off-season. There are signs that the scheme is gaining the support of the people owing to the reduction in hard manual labour and to the increased income obtained from it in normal years.

In Mahenge District the Native Authority tractors and ploughs were sold at their depreciated value to a local firm which operates the rice mill and three cotton ginneries. The firm has ploughed 300 acres for Africans at a charge of Shs. 30/- per acre. This low charge is possible because these little-used tractors have been sold at their depreciated value and charges for repairs and spare parts should not be much for some time. Africans in Dodoma District made no request for ploughing to be done by the Native Authority tractor which was employed instead on dam construction.

The Rovuma Valley Ploughing Scheme in the Southern Province had a difficult year. The Pilot Scheme itself has been a success and has shown that the land can be ploughed cheaply and that the people want to grow rice in the Rovuma valley. However, it has become very apparent that tractors cannot be run in this area without European supervision and to justify the wages of a European supervisor it is essential that the scheme be enlarged and taken over by some body other than the Agricultural Department as is done in both the Lake and Eastern Provinces. Applications were received for some 3,000 acres to be ploughed but the scheme only managed to plough some 750 acres with the three wheeled tractors employed since two tractors were out of action for most of the time due to accidents of various kinds. The potential of land in this area which could be mechanically cultivated is put at 20,000 acres apart from the numerous small areas of up to 300 acres each in the Newala section of the Rovuma valley.

In the Pare District of Tanga Province further increases in the area cultivated by mechanical means are reported. In this area tractor ploughing of the irrigable land at the base of the mountain mass has become very popular for the growing of maize. Since irrigation is available good maize crops are assured and cultivators can afford to pay comparatively high ploughing fees. Ploughing must be completed in the comparatively short period between the recession of the flood water and the latest time of planting to secure satisfactory ripening of the maize crop, and tractor ploughing is the only way to get the work done in the time available. A European contractor has done the bulk of the ploughing in the past year although a start has been made by the son of a Pare chief, who purchased a wheeled tractor with a loan from the Agricultural Development Loan Fund. Acreages cultivated in the past year were:—

| *Contractor* | *Equipment* | *Acres ploughed* | *Acres harrowed* |
|---|---|---|---|
| A. ... ... ... | 2 County Fordson Major ... | 1,843 | 240 |
| B. ... ... ... | 1 Wheeled Fordson Major | 160 | – |
| Native Treasury ... | 1 Wheeled Massey-Harris 744 D ... | 240 | – |
| | Total ... | 2,243 | 240 |

All three contractors charged Shs. 50/- per acre for ploughing and Shs. 25/- for harrowing.

As the result of high prices obtainable for cotton (Lake Province), coffee (Northern) and maize (Iringa), increasing numbers of tractors are being purchased by Africans who use them on their own larger than average holdings and also contract to their neighbours. This trend of development necessitates a continual watch on the part of the Department to prevent undue soil erosion.

## GOVERNMENT FOOD FARMS

### Lupiro and Kivukoni

The pilot schemes at Lupiro and Kivukoni to test the practicability and ascertain the cost of growing paddy under complete mechanical cultivation were continued during 1954. The total area ploughed was 650 acres of which 510 acres were planted before heavy rain made further planting impossible. In all 404¼ tons of paddy were harvested from 485 acres, giving an average yield of 830 kilograms per acre. The main variety grown is Kahogo but as this lodges badly on the rich alluvial soil, a non-lodging variety having a short, strong straw must be found if combining losses are to be avoided. The only suitable tractors available at the time the original scheme started were reconditioned International Harvester TD 9 machines and these are now becoming very expensive in maintenance costs. Nevertheless a substantial profit was again made, even after charging high depreciation and overheads.

A full report of these pilot schemes including experimental work conducted appears in Part II of this report.

## SOIL AND WATER CONSERVATION

The full report of the Chief Soil Conservation Officer is printed in Part II of this report. The main demands on the Mechanical Units for work to be done against payment continued to come from European farmers in Northern Province although some African Councils have placed orders for dams to be constructed.

The following mechanical work was completed during the year:—

| | |
|---|---|
| Broad-based terracing ... ... ... ... | 974 acres |
| Diversion channels and drainage ways ... ... | 4·2 miles |
| Waterways and Training Banks ... ... ... | 2·4 miles |
| Dams and Hafirs ... ... ... ... ... | 35 units |

A new feature of water conservation was the construction of night storage tanks on coffee estates and arable farms that practise irrigation. These tanks store the night flow of furrows which would otherwise go to waste, because night irrigation is found by most farmers to be impracticable. Thus for a modest expenditure of £100 to £300, farmers have been able to double the irrigable area on their lands, and still irrigate in daylight.

A course for the Field Officers of the Agricultural Department was held in March/April to teach methods of soil conservation.

Trash-bunding is possibly the most widely practised soil conservation measure in African areas in the Northern Province and its use is now backed by Native Authority Orders. Little difficulty is experienced in persuading African cultivators to follow this method although a few cases of non-compliance have

still to be taken to court from time to time. In the Olkokola area of Arusha District a good step forward was the demarcation during 1954 of nearly two square miles of the worst overgrazed portion of the area which the tribe has agreed to rest for a period of three years. The recovery of the grass in less than one year has been remarkable. A considerable extension of sisal hedges for the demarcation of road reserves and cattle tracks was also recorded, and the demand for further planting material is very great. Little progress has been made in finding suitable trees for windbreaks in this area but two indigenous species appear to be capable of establishing themselves from cuttings. All exotics tried so far have been failures with the exception of Black Wattle which appears to be easy to establish on raw sub-soil but which will not take if planted or sown directly on the top soil.

In the Lake Province, emphasis was laid on tie-ridging, manuring of land and closing of hill-tops to grazing. In North Mara and Maswa Districts areas were demarcated for resting from all agriculture and grazing owing to the erosion caused by the bad management of the excessive numbers of cattle. Thirty-one dams were constructed in Sukumaland during the year; twenty-eight of these were hand-built and three by mechanical equipment. Most of this work was done by the Water Development Department and Sukumaland Development but the Agricultural Department assist whenever possible. In addition, four sub-surface dams were constructed in river beds—two in Maswa and two in Shinyanga. Central Sukumaland has gone a long way towards the goal of a permanent water supply every five miles. Dams constructed in other parts of the Lake Province consisted of two in Biharamulo and one in Ngara; two dams previously started in Musoma were completed and six new dams were begun of which four were completed. Five dams were completed in North Mara and three in Mwibara, Ukerewe mainland.

Tie-ridging is also the main soil conservation measure recommended and practised in the Western Province, and provided a steady pressure of advice is kept up little difficulty is experienced in making the practice customary. Erosion due to overstocking and overgrazing is evident in several areas. In the highland areas of Ufipa and Kasulu Districts attempts were made to move cultivators to gentler slopes for the cultivation of annual crops. Forty-five dams and tanks were built by communal labour in Nzega District during the year but these were primarily for water supplies for stock. No further dams were built by the Agricultural Department for irrigation of rice fields although there was a marked increase in the number of Africans seeking advice and help on the construction of their own dams for this purpose. Work continued on the reclamation of Rugusye swamp in Kibondo District and some 500 acres have now been reclaimed. Very high yields of maize and beans are obtained on this reclaimed area. Routine maintenance work was continued on the re-aligned channel of the Luiche river which was dug in 1949/50 to drain the Luiche swamp.

The policy recommended for the Central Province is the contour banking of uncultivated land wherever this is possible, and the protection of cultivated areas by such measures as trash-bunds, tie-ridges or contour banks. The response is seldom spectacular, but definite and appreciable progress is being achieved. More lasting results may be possible by introducing the "Bush School" method of propaganda developed so successfully in the Uluguru Land Usage Scheme. In Dodoma District, with financial assistance from the East African Railways

and Harbours, contour banking and gully stopping were undertaken on 2,500 acres of land in order to protect the railway line in the Msomalo and Igandu areas, thus completing a scheme initiated by the Agricultural Department some fifteen years before. Fifteen small dams are being constructed in a large gully at Msomalo to impound all the run-off and induce a perennial stream at the lower end of the gully. The whole area which has been contour-banked at Msomalo now amounts to 4,000 acres; the run-off from this area converges on three railway culverts, and the railway authorities have spent considerable sums of money in the past in repairing the damage caused by flood waters. Provided that the protective works are carefully maintained and livestock prevented from destroying the grass cover, there should be no further washaways on this section of the line. Due to drought, the numbers of livestock in Ugogo have decreased to such an extent in the past two years that even in December patches of ungrazed grass could frequently be seen, a situation which has not occurred for many seasons. Famine relief works in the Central Province in 1954 included the construction of eighteen hafirs in Dodoma District and twenty-eighty hafirs in Mpwapwa District each with a capacity of 350,000 gallons. In Mpwapwa District ten contour banking projects have been undertaken in important catchment areas, the planting of Euphorbia windbreaks being included in two of the contourbanking schemes.

On non-native farms in Southern Highlands Province the former policy of marking out contour banks for the farmer to construct with his own machinery or with terracers hired from the Soil Conservation Service was continued. Four such terracers were maintained in the area. The amount of work done depends on the initiative and determination of the farmer, and while there is a tendency for soil conservation work to conflict with other work on the farm during and immediately after the rains the amount of progress recorded in some cases is disappointing. Unfortunately the construction of contour banks and terraces cannot be continued throughout the whole of the dry season because the soil on most of the farms sets very hard. In the Ismani area of Iringa District the present high price of maize has encouraged increasing numbers of Africans in employing labour to clear large areas of land and to grow maize without paying any attention to recommended soil conservation measures. Additional numbers of African Instructors have been sent to the area in an effort to prevent the land from being ruined.

On Mbeya Mountain the sociological problem of preventing backward and stubborn tribesmen from destroying very important catchment areas remained unsolved.

Tie-ridging is the recommended form of soil cultivation in Southern Province except in the Matengo highlands of Songea where the traditional "pit" system of cultivation is still maintained. Visits were paid by Soil Conservation staff to tobacco farms in the Tunduru area where the construction of narrow-base terraces on a slope of 1 in 400 was recommended.

## LAND USAGE SCHEMES

(a) *Eastern Province.*—In the Uluguru Land Usage Scheme the "Bush School" technique of adult instruction was continued although experience has shown that it is better to give several short courses, each lasting one morning, than to try to cover a wider syllabus over a period of three mornings. The additional

instruction is given in "follow-up schools" embodying practical demonstrations, organization of conservation work by communal effort on regular days of the week and by giving special training in soil conservation methods. In a number of areas the results have been spectacular as the following figures show—in 1954, 11 square miles of land were bench-terraced compared with $3\frac{1}{2}$ square miles in 1953 and $1\frac{1}{4}$ square miles in 1952.

*Rufiji Basin.*—The survey party sponsored by the Food and Agriculture Organization and Colonial Development and Welfare made firm progress under the energetic leadership of Mr. N. Simanski. One Agricultural Officer was seconded to the team. Soil survey work was undertaken in the main valley, preliminary reconnaissance of dam sites was undertaken, many hydrological gauging stations were established, communications were improved, and plans were drawn up for more detailed work, including four trial plots during the coming year.

(b) *Lake Province. Geita Controlled Settlement Scheme.*—It is estimated that immigration into Geita District from other parts of Lake Province continues at the rate of over a hundred people every day. The people settle in the areas demarcated and apart from being obliged to abide by the rules of land protection and good husbandry are subject to as little interference as possible. The scheme works well.

*Maswa Settlement Schemes.*—It is now considered that dam making and bush clearing in Maswa District have gone too far ahead without the equally essential control of settlement and the husbandry of the settlers. The result is that several of the areas near water are over-crowded by stock and erosion is already serious. Plans are in hand to control this development, particularly the protection of areas round dams.

The controlled settlement schemes in Ndagalu (Kwimba), Majita (Musoma) and Mwibara (Ukerewe) are progressing satisfactorily. In North Mara a small pilot scheme at Isambero to establish grazing reserves and to close eroded areas made good progress.

*Ngara District re-settlement.*—The Ruganzo settlement scheme in Ngara, designed to relieve overcrowding in the feudal areas of Bugufi is going well. A total of 170 families have decided to move in and immigration has begun. A dam and a hospital have been built.

(c) *Tanga Province.*—The Usambara Scheme was started in 1950 when it was decided to apply to the whole of the district the lessons and findings learnt from the Pilot Scheme started in 1946 in the Mlalo basin. The scheme is worked through the Native Authorities as the Executive Body and legally hinges on a series of Native Authority Rules. The two main Conservation Rules in the area at present are:—

(i) Contour tie-ridge cultivation on slopes of less than 25 degrees, where land is planted to annual crops.

(ii) On slopes greater than 25 degrees, the establishment of perennial crops to the exclusion of annual crops.

Closure of land to annual crop cultivation where the slope exceeds 25 degrees is the most unpopular of the Scheme Rules and the hardest to enforce in practice. There is a high percentage of land of over 25 degrees slope in the escarpment areas skirting the main mountain block and as the people living in these areas

do not at the moment seem prepared to change from maize to bananas as their staple food crop, they are naturally averse to establishing bananas on their existing land because there is no alternative land for maize unless they move right down on to the plains. Trials of bench terracing on slopes in excess of 25 degrees have now been laid down. The "no-burning" rule has been fairly well observed as has the rule prohibiting the grazing of stubble on harvested fields since this was apparently an established practice of the tribe which had only been discarded in recent years.

*Usambara Scheme* (*Plains*).—This section of the scheme deals with the possibility of settlement on the plains below the Usambara mountain mass. Trials so far conducted show that sorghum and groundnuts give consistently higher yields in this area than the maize and beans normally grown by African cultivators, also that a yellow-grained Katumbili maize has given far higher yields in trial plots than the Hickory King type of maize which Africans prefer to plant at present. Cotton has again proved to be the most suitable cash crop. Trials have continued on the reclamation of saline soils.

## VERMIN, INSECT PESTS AND PLANT DISEASES

*Grain-eating birds*.—The short-rains wheat crop in the Northern Province suffered from the depredations of the Sudan Dioch (*Quelea quelea*) but the long-rains crop escaped serious damage. The most successful control measure consists of blowing up roosts with a petrol/diesel mixture exploded with gelignite. An improvement in technique for such exercises was devised wherein by systematic driving of the birds when they come in to roost, they can be concentrated into a much smaller area with resultant saving of time and materials in the subsequent explosion. In a nesting site destroyed at Oldeani it was estimated that the weight of birds which succumbed amounted to over 200 tons. Experiments were carried out on spraying DNOC solution from the air on a nesting site covering several square miles in thick thorn bush but this was not successful.

*Locusts*.—In the early part of the year a number of escape swarms of the Desert Locust (*Schistocerca gregaria*) from Northern Kenya invaded Northern and Tanga Provinces, but were successfully broken up by aerial spraying by the Desert Locust Control Service. At the end of the year, heavier swarms from Southern Ethiopia and Somaliland, which would normally have been expected to lay in Northern Kenya flew further south because of the delayed onset of the rains; they crossed into Tanganyika and laid egg-fields covering hundreds of square miles in various parts of the Northern, Central, Western and Lake Provinces. Staff of the Desert Locust Control Service arrived at the end of December to organize the campaign against the hoppers.

Egg-laying by Red Locusts (*Nomadacris septemfasciata*) occurred over several square miles of the Rukwa valley and staff of the International Red Locust Control Service in the area were dealing with the outbreak at the end of the year.

*American Bollworm* (*Heliothis armigera*). A widespread attack of American Bollworm occurred in the Northern Province, maize, beans and sorghum crops being affected. In the Loljoro area where the attack was particularly severe, spraying from the air was undertaken by a contract firm with considerable success. American Bollworm was also the most serious pest of cotton in the Lake Province

where it is estimated that over 2,500 bales of cotton were lost in Musoma District alone on account of this pest. Dusting trials on cotton were again carried out in the Eastern Province on a field scale using a mixture of 10 per cent DDT and 3 per cent BHC in talc.

*White Stem Borer* (*Anthores leuconotus*). This pest is prevalent in arabica coffee in the lower altitude areas; trials conducted by the Entomologist, Lyamungu, have shown the value of dieldrin in controlling it.

*Coffee Berry Borer* (*Stephanoderes hampei*). Work conducted in the field during the year has shown that plant sanitation is a more effective control than insecticide.

*Army Worm* (*Laphygma exempta*). This plague on an unprecedented scale was the underlying cause of the famine in Central Province since the limited areas which escaped damage harvested adequate crops. Even in a year of reasonable rainfall the widespread nature of the outbreak would have seriously reduced the harvest but in a year of sparse rainfall the results were calamitous.

*Banana weevil* (*Cosmopolites sordidus*) causes much damage to bananas in North Bukoba and it is feared that the pest is increasing. Recently there is evidence that the people are realizing the danger and are taking some action.

*Banana Wilt* or *Panama Disease* was not very prevalent on account of the dry year. One small outbreak was reported from Tanga Province and all diseased plants were destroyed. The trial to test resistant varieties was continued, but it is still too early to draw any conclusions.

*Blackarm* or *Bacterial Blight* (*Xanthomonas malvacearum*). The disease was prevalent in the Lake Province but appears to have been kept in check in 1954 by periods of drought and the use of Perenox dusted seed. Perenox was dusted on 2,200 tons of seed for the 1954 crop and on the entire seed requirement (4,700 tons) for the 1955 crop.

*Vermin* continue to take their toll of cultivated crops especially in areas where there is much virgin bush adjacent to cultivated land. This is particularly so in the Southern Province and the following figures of animals known to have been killed in organized drives during the year gives some idea of the extent of crop loss in this way:—

| *Baboon* | *Monkey* | *Pig* | *Hippo* | *Rats* |
|---|---|---|---|---|
| 4,001 | 10,448 | 1,721 | 15 | 8,665 |

The Handeni District Council passed a new rule in September, 1954, whereby every taxpayer in a village in addition to planting any cassava on his own land must now have one acre of cassava in an area of individually owned plots all planted together at a place directed by the Village Headman. Further, the Village Headman is charged with the responsibility of seeing that this aggregated area of cassava is adequately protected from vermin, chiefly baboon and pig, which have been the biggest obstacle to cassava growing in the former scattered plots.

In the Lake Province two Vermin Control Officers were employed by the Lake Province Cotton Committee and the work done by them and their staffs was much appreciated by the people who usually give all necessary co-operation. it is seldom, however, that the people take action on their own behalf to organize vermin destruction.

## AGRICULTURAL EDUCATION

At the Ukiriguru Agricultural Training Centre the two-year training course No. XIII was completed with the following results:—

| | Certificates | | | |
|---|---|---|---|---|
| | 1st Class | 2nd Class | 3rd Class | Pass |
| Higher Course Instructors ... | 1 | 11 | 6 | – |
| Lower Course Instructors ... | 3 | 11 | 5 | – |
| Teachers Course ... ... | 4 | 12 | 3 | – |

In September, 1954, forty-nine Instructors and five Teachers completed the first year of training of Course XIV. In October, 1954, forty-six Instructors, thirty-two Teachers and two Instructors employed by the Lake Province Cotton Committee arrived at the Centre to start Course XV. Course XIV re-assembled in November to start its second year of training.

The Indian School of Agriculture at Morogoro closed down in 1954 pending the finding of a new site having an adequate area of land suitable for mixed farming. A site has now been found and a start will be made on the new school in 1955.

## FISHERIES

*Fisheries* (Inland).—On Lake Tanganyika the entire *dagaa* fisheries fleet in the Kigoma–Ujiji area is now equipped with pressure lamps to attract the fish and *mwenge* wood fires for this purpose are now extremely rare in the Northern section of the Lake. The use of these lamps has led to an increase in fishing effort with consequent heavier landings of *dagaa*. ~~2,168~~ tons were despatched from Kigoma during 1954 compared to 1,042 tons in 1953. The emphasis of work on this fishery has now shifted to the improvement in the quality of the dried product and to problems connected with marketing. The Fisheries Officer (Inland) transferred from Kigoma during the year and the fisheries base there has been put on a care and maintenance basis.

Radical changes in the marketing of fish from Lake Rukwa were made in May, 1954, on the recommendation of the Lake Rukwa Fisheries Board, and the amount of fish marketed has increased enormously as the following figures show:—

| | |
|---|---|
| October, 1953 to May, 1954 ... | 115,140 lb. (weight) |
| June–November, 1954 ... ... | 1,097,986 fish (numbers) |

These figures do not include fish caught for local African use.

A profitable opening for almost unlimited supplies of cured fish was obtained in the Rhodesia Copper Belt during the latter half of the year and regular consignments were sent there by road every week.

*Fisheries* (*Marine*).—The refitting of M.F.V. *Patoni* was completed in February, 1954, but frequent mechanical trouble has been experienced since then and comparatively little time has been employed on fishing. Trawling was attempted on three occasions but was not successful although the gear fished well. An echo-sounder was used to locate shoals of fish but in the areas where trawling is possible no traces of fish were indicated on the echo-sounder. Fishing by hand line was employed over coral banks.

*Fish Farming.*—The layout of the ponds at the Experimental Station at Korogwe now consists of 8 fry ponds, 6 breeding ponds, 9 production ponds and 4 rice-cum-fish ponds—a total of 27 ponds in all. No new ponds were constructed during the year. Fry of seven different species were supplied to many districts in the Territory and courses of instruction were held at Korogwe from time to time for the training of Africans in fish farming methods. The rice-cum-fish experiment using *Tilapia melanopleura* was repeated during the year but the yield of rice was disappointingly small and search for a more suitable variety continues. Co-operation with the Medical Department continued in connection with the biological control of bilharzia and malaria by means of fish. In many other parts of the Territory disappointing results have been reported from trials of fish farming and the causes are being investigated.

## SHOWS AND EXHIBITIONS

*Sukumaland Show.*—The Sukumaland Show, held at Ngudu at the end of July, developed far beyond the original plans. It contained features of the greatest interest and educational value, but suffered from the multiplicity of interests, the stress on entertainment and from subversive propaganda. Ukiriguru Farm deservedly won the Departmental stand competition, but the other Agricultural Department and Lake Province Cotton Committee exhibits were also well prepared and worthy of praise. The general standard of produce was not as good as it could be with more experience in the technique of showing. Smaller shows were held at Tarime and at Bukara Chiefdom, Bukoba, which were well attended and were of great interest and value to the people. It is proposed to hold a Trade Show in Mwanza in 1955 and to concentrate on small district or chiefdom agricultural shows.

## LEGISLATION

*Coffee.*—An export tax on coffee was imposed during 1954; the rate payable varies with the kind of coffee (arabica or robusta) and the manner in which it has been processed.

*Plant Protection Rules*, 1954.—Methods of dealing with plant pests and diseases are set out.

*Plant Protection (Pests) Order*, 1954.—Declaration of certain trees and shrubs as pests, since they act as wild host plants of Coffee Stem Borer.

*Tea (Amendment) Rules*, 1954.—Deals with the issue of export permits for made tea.

*Sunflower.*—The Produce Export (Sunflower Seed) Rules, 1954, laid down that sunflower seed may only be exported in new bags containing less than 115 lb. net weight of sunflower seed, the bags to be securely and doubly sewn with blue thread, and marked in blue with the words "Sunflower Seed" in block letters not less than 2 in. high.

## EXPERIMENTS AND INVESTIGATIONS

The following reports are published in full in Part II of this Report which is printed as a separate publication:—

Cotton and Other Crops:

Ukiriguru Agricultural Station—Progress Report for the season 1953/54.

Ilonga Agricultural Station—Summary of report for 1954.

Colonial Agricultural Insecticide Research Unit, Ilonga—Summary.

Coffee:

Coffee Research Station, Lyamungu, Moshi—Summary of report for the year 1954. (The full report is published by the Coffee Board of Tanganyika).

Maruku Coffee Station, Bukoba—Account of work for the year 1954.

Sisal:

Sisal Research Station, Mlingano, Ngomeni—Annual Report for the year 1954.

Entomology:

Entomologist, Morogoro—Annual Report for the year 1954.

Entomologist, Lyamungu—Annual Report for the year 1954.

Plant Pathology:

Plant Pathologist, Lyamungu—Annual Report for 1954.

Botany:

Botanist, Ukiriguru—Annual Report for 1954.

Soil Conservation:

Chief Soil Conservation Officer—Annual Report for 1954.

Field Experiments:

Agricultural Officer (Experiments), Iringa—Annual Report for 1954.

Coast Agricultural Station—Summary of the report of the Agricultural Officer, Chambezi, for 1954.

Government Food Farm—Summary of the report of the Officer-in-charge, Lupiro Food Farm, for the year 1954.

Fisheries:

Fisheries Officer (Marine)—A Report for 1954.

Fisheries Officer (Fish Farming)—A Report for 1954.

## PUBLICATIONS

Articles published in the *East African Agricultural Journal* in 1953 were:—

*April issue:*

"Dagaa Fisheries in Lake Tanganyika" by G. J. Lockley.

"*Acacia* spp. as Shade Trees for Coffee" by J. K. Robertson.

*July issue:*

"A simple and inexpensive Insecticide Duster" by G. Swaine.

"Observations on the Sorghum Shoot Fly" by G. Swaine and Catherine A. Wyatt.

*October issue:*

"Maize Growing at Ismani, Iringa, Tanganyika" by M. Lunan and J. Weir.

"Underground Storage of Maize in Tanganyika" by G. Swaine.

The following publications were produced during the year:—

*Departmental Pamphlets*

Pamphlet No. 59: Nineteenth Annual Report of the Coffee Research and Experimental Station, Lyamungu, for 1952.

Pamphlet No. 60: Twentieth Annual Report of the Coffee Research and Experimental Station, Lyamungu, for the 1953/54 season.

*Mycological Circulars*

Circular No. 35: Index to References to Plant Diseases in Laboratory.

*Publications*

Circular No. 36: Tanganyika Fungus List: Recent Records No. XVIII.

*Entomological Leaflets*

Leaflet No. 24: Spraying Coffee.

*Fisheries Series*

Pamphlet No. 3: Some Facts and Figures on Fish Farming.

## STAFF

The Director of Agriculture, Mr. C. E. J. Biggs, retired on 13th December after serving for over five years in the post. The Deputy Director, Mr. J. R. P. Soper was promoted to fill the vacancy, and Mr. A. P. S. Forbes assumed duty as Deputy.

A further retirement in December deprived the Department of the valuable services of Mr. C. J. McGregor, Regional Assistant Director, who joined the Department as an Agricultural Officer in 1928.

One Agricultural Officer resigned at the end of his first tour and another was absent for a large part of the year on a F.A.O. Fellowship studying irrigation practice in Australia and the Far East. Four officers arrived in August on first appointment and two others returned after their year's training in Trinidad. The establishment was increased to fifty-six posts, but only thirty-eight of these were filled at the end of the year.

On the specialist side a Botanist (Plant Breeder) arrived on first appointment, one Entomologist resigned after only one tour, and the probationary period of one Fisheries Officer was terminated.

The Field Officer (Agriculture) establishment was as usual below strength and recruitment was made more difficult by the decision of the United Kingdom Government not to issue passports to men below the age of twenty-six who had previously been exempted from National Service. During the year there was a net reduction of ten posts, three of which balanced an increase in the numbers of promotion posts of Superintendent of Agriculture. There were twelve casualties and only five new appointments leaving twelve posts unfilled at the end of December.

The status of Assistant Agricultural Officers (Makerere diplomates) was greatly improved by the implementation of the Salary Commission's Report.

## STAFF—EUROPEAN

1 Director
1 Deputy Director
1 Chief Soil Conservation Officer
4 Regional Assistant Directors
2 Senior Research Officers
2 Entomologists
2 Plant Pathologists
2 Botanists
38 Agricultural Officers
2 Tobacco Officers
2 Agricultural Officers (Ginnery)
3 Fisheries Officers (2 Supernumerary)
6 Superintendents of Agriculture
1 Master Fisherman (Supernumerary)
82 Field Officers (Agriculture) (6 Supernumerary)
1 Executive Officer (Production Committee)
1 Entomologists' Assistant (Temporary)
2 Education Officers (Seconded from Education Department)
5 Temporary Crop Supervisors
1 Temporary Scientific Assistant
1 Secretary (Agricultural Officer seconded as Secretary)
1 Chemist (seconded from Government Chemist's Department)
1 Horticulturist
1 Office Superintendent
1 Junior Field Officer (Agriculture)
3 Stenographers
2 Temporary Stenographers
1 Mechanic
1 Zoologist

The Clerical Staff consisted of:—

1 Office Assistant
116 Clerks

The Field Staff included:—

1 Indian Master
1 Telephone Operator
1 Engineer (M.F.V. *Patoni*)
1 Mate (M.F.V. *Patoni*)
2 Chemical Assistants
7 Laboratory Assistants
6 Assistant Agricultural Officers
9 Coffee Grading Assistants
100 Recorders
1,400 Instructors (Agriculture)
29 Instructors (Copra Industry)
12 Instructors (Fisheries)
1 Industrial Instructor
10 Junior Farm Bailiffs
11 Artisans
25 Overseers
12 Motor and Tractor Drivers
11 Levellers and Assistants
1 Works Overseer
6 African Produce Graders
8 Nursery Headmen (Coffee Extension)
200 Subordinate Staff.

## CONCLUSION

Both Mr. Biggs and I have great pleasure in recording our appreciation of the loyal and whole-hearted way in which we have been supported by the Departmental staff. Our thanks are also due to those members of the public who have given unstinting voluntary service on Commodity Boards and Production Committees.

J. R. P. SOPER,
*Director of Agriculture*

8th February, 1955.

## MONTHLY RAINFALL IN INCHES FOR SEASON 1953/54 AND YEAR 1954 AT PROVICIAL STIONS

| | Eastern Province Morogoro | | Central Province Dodoma | | Western Province Tabora | | Lake Province Mwanza | | Southern Highlands Province Mbeya | | Northern Province Arusha | | Tanga Province Lushoto | | Southern Province Lindi | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. | Ins. | Average Ins. |
| October, 1953 ... | 1·11 | 0·93 | 0·00 | 0·20 | 0·23 | 0·60 | 2·02 | 1·89 | 0·10 | 0·61 | 2·75 | 1·12 | 3·57 | 1·37 | 0·35 | 0·69 |
| November, 1953 ... | 0·41 | 2·14 | 0·00 | 0·75 | 1·45 | 4·00 | 3·96 | 4·58 | 1·43 | 2·27 | 2·57 | 3·60 | 6·25 | 3·85 | 0·48 | 2·12 |
| December, 1953 ... | 2·93 | 2·81 | 7·02 | 3·12 | 8·11 | 6·64 | 5·99 | 5·69 | 4·13 | 5·32 | 3·99 | 4·33 | 2·52 | 4·32 | 7·80 | 5·72 |
| January, 1954 ... | 6·73 | 3·78 | 2·33 | 5·23 | 5·49 | 4·99 | 5·65 | 3·68 | 6·47 | 7·56 | 3·12 | 1·81 | 3·87 | 2·95 | 8·49 | 5·73 |
| February, 1954 ... | 4·38 | 3·79 | 1·34 | 3·51 | 4·11 | 4·88 | 5·03 | 4·11 | 2·62 | 6·44 | 0·64 | 2·84 | 2·28 | 2·87 | 3·52 | 4·56 |
| March, 1954... ... | 3·18 | 6·93 | 2·66 | 4·74 | 0·98 | 6·73 | 1·09 | 6·27 | 1·41 | 6·49 | 0·79 | 6·38 | 5·33 | 5·63 | 1·92 | 6·48 |
| April, 1954 ... ... | 7·00 | 8·15 | 1·46 | 1·85 | 6·92 | 5·39 | 7·68 | 5·64 | 2·12 | 4·59 | 11·49 | 13·81 | 8·67 | 8·91 | 5·73 | 7·65 |
| May, 1954 ... ... | 6·34 | 3·87 | 0·05 | 0·18 | 0·95 | 1·12 | 5·85 | 3·67 | 1·39 | 0·68 | 8·28 | 7·50 | 8·03 | 7·33 | 1·81 | 1·48 |
| June, 1954 ... ... | 0·00 | 1·09 | 0·00 | 0·06 | 0·00 | 0·11 | 0·18 | 0·79 | 0·00 | 0·04 | 0·29 | 1·02 | 0·87 | 2·07 | 0·02 | 0·36 |
| July, 1954 ... ... | 0·62 | 0·54 | 0·00 | 0·00 | 0·00 | 0·00 | 0·50 | 0·54 | 0·00 | 0·03 | 0·00 | 0·44 | 1·21 | 1·41 | 0·00 | 0·33 |
| August, 1954 ... | 0·15 | 0·39 | 0·00 | 0·00 | 0·00 | 0·04 | 0·13 | 0·80 | 0·00 | 0·06 | 1·13 | 0·58 | 1·66 | 0·86 | 0·09 | 0·23 |
| September, 1954 ... | 0·14 | 0·65 | 0·00 | 0·00 | 0·06 | 0·29 | 1·66 | 1·76 | 0·04 | 0·11 | 0·00 | 0·66 | 0·10 | 0·69 | 2·09 | 0·48 |
| Total for season | 32·99 | 35·07 | 14·86 | 19·64 | 28·30 | 34·77 | 39·74 | 39·42 | 19·71 | 34·20 | 35·05 | 44·09 | 44·36 | 42·26 | 32·30 | 35·83 |
| October, 1954 ... | 2·13 | 0·94 | 0·00 | 0·19 | 0·03 | 0·59 | 0·19 | 1·90 | 0·04 | 0·59 | 0·10 | 1·15 | 1·83 | 1·42 | 0·42 | 0·67 |
| November, 1954 ... | 0·29 | 2·09 | 0·00 | 1·11 | 1·73 | 3·95 | 2·57 | 4·56 | 0·78 | 2·23 | 1·10 | 3·43 | 1·43 | 3·90 | 1·18 | 2·02 |
| December, 1954 ... | 2·69 | 2·81 | 4·35 | 3·35 | 8·34 | 6·68 | 7·47 | 5·71 | 7·33 | 5·26 | 4·94 | 4·34 | 3·81 | 4·28 | 1·96 | 5·85 |
| Total for year, 1954 | 33·65 | 35·03 | 12·19 | 20·22 | 28·61 | 34·77 | 38·00 | 39·43 | 22·20 | 34·08 | 31·88 | 43·96 | 39·09 | 42·32 | 27·23 | 35·84 |

## EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1950—1954

| | Maximum Export prior to 1954 | | 1950 | 1951 | 1952 | 1953 | 1954 | Export value, 1954 |
|---|---|---|---|---|---|---|---|---|
| | | | Amount | Amount | Amount | Amount | Amount | |
| | Year | Tons | Tons | Tons | Tons | Tons | Tons | £ |
| Sisal | 1953 | 171,151 | 118,909 | 142,106 | 156,167 | 171,151 | 167,642 | 10,902,109 |
| Cotton lint | 1953 | 14,749 | 7,006 | 8,315 | 11,105 | 14,749 | 12,111 | 3,356,844 |
| Coffee | 1952 | 18,619 | 14,991 | 16,565 | 18,619 | 15,239 | 19,382 | 10,002,726 |
| Barley | 1952 | 88 | — | — | 88 | – | 293 | 6,023 |
| Beans and Pulses | 1952 | 23,184 | 8,078 | 10,638 | 23,184 | 10,551 | 10,432 | 525,536 |
| Beans, Soya | 1953 | 674 | — | — | — | 674 | 522 | 21,371 |
| Cashew nuts | 1952 | 11,506 | 6,532 | 8,165 | 11,506 | 11,358 | 16,298 | 554,009 |
| Castor seed | 1952 | 12,345 | 3,302 | 7,570 | 12,345 | 11,754 | 9,609 | 396,518 |
| Cassava | 1952 | 15,177 | 142 | 6,342 | 15,177 | 561 | 1,714 | 27,850 |
| Copra | 1928 | 9,318 | 886 | — | 5,505 | 1,083 | 2,046 | 145,985 |
| Fats | 1948 | 1,689 | 20 | 123 | 79 | 69 | 91 | 5,882 |
| Gum, Arabic | 1950 | 2,319 | 2,319 | 1,689 | 564 | 1,346 | 1,534 | 141,357 |
| Gum, Copal | 1950 | 110 | 110 | 99 | 11 | 38 | 58 | 3,937 |
| Groundnuts | 1936 | 22,786 | 75 | 3,499 | 9,435 | 1,088 | 2,503 | 182,009 |
| Kapok | 1953 | 838 | 653 | 381 | 468 | 838 | 581 | 148,781 |
| Maize | 1952 | 8,353 | 7 | 559 | 8,353 | 234 | — | — |
| Millet and Sorghum | 1928 | 7,732 | 1 | 4,137 | 2,767 | 1,958 | 17 | 623 |
| Onions | 1948 | 2,418 | 296 | 446 | 187 | 187 | 872 | 3,829 |
| Palm kernels | 1953 | 578 | 323 | 334 | 374 | 578 | 674 | 32,158 |
| Papain | 1948 | 130 | 19 | 18 | 43 | 83 | 103 | 154,864 |
| Prethrum | 1945 | 697 | 175 | 149 | 156 | 155 | 136 | 40,472 |
| Rice | 1938 | 17,965 | 30 | 151 | 343 | 3 | 72 | 2,817 |
| Rubber | 1944 | 1,314 | 8 | 20 | 2 | — | — | — |
| Sesame seed | 1938 | 5,241 | — | 22 | 496 | 343 | 3,108 | 232,298 |
| Sugar | 1941 | 5,454 | 2 | 5 | 10 | 1 | 2 | 146 |
| Sunflower seed | 1952 | 17,708 | 8,911 | 9,512 | 17,708 | 6,180 | 10,202 | 322,550 |
| Tea | 1953 | 1,122 | 484 | 821 | 1,011 | 1,122 | 1,566 | 503,917 |
| Tobacco | 1948 | 1,421 | 1,130 | 781 | 641 | 333 | 350 | 66,529 |
| Vegetable Oils | 1940 | 2,268 | 1,400 | 130 | 685 | 1,063 | 723 | 80,920 |
| Wattle bark | 1953 | 2,009 | 1,976 | 1,318 | 979 | 2,009 | 2,122 | 44,309 |
| Wheat | 1945 | 4,511 | — | — | — | — | 10 | 431 |
| Essential oils | 1950 | 9 | 9 | 6 | 3 | 3 | 2 | 4,430 |
| Total | — | — | 184,463 | 229,429 | 305,524 | 261,319 | 274,775 | £27,911,230 |